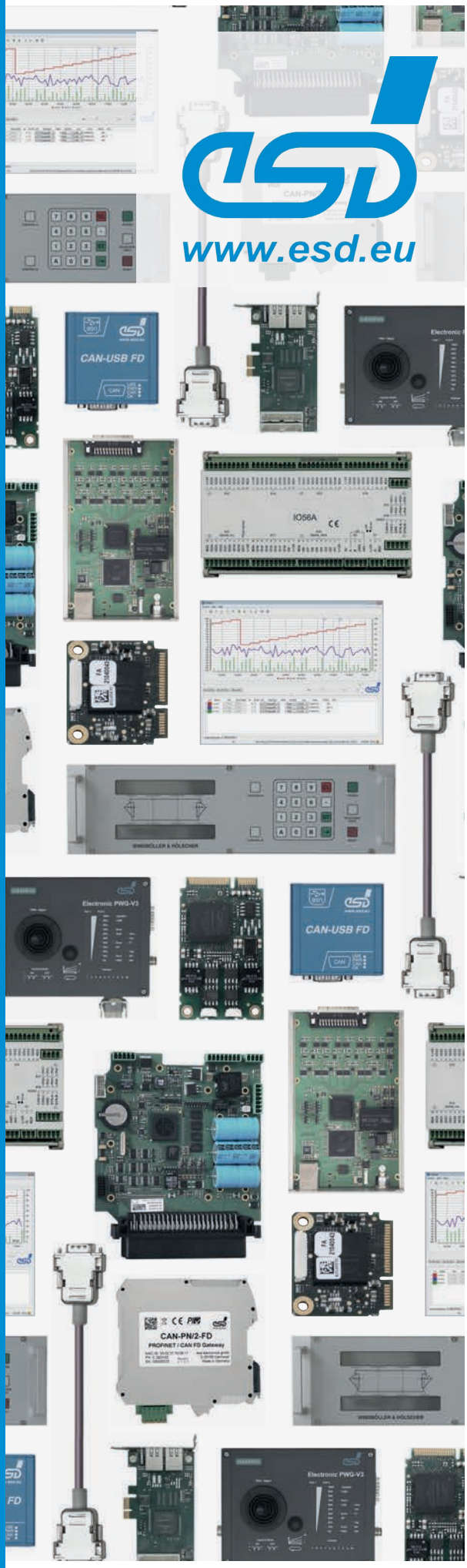
esd electronics

Products

2024

CAN Interfaces
EtherCAT
Gateways
I/O Modules
Networking
VME

Customized Design



Quality Products - Made in Germany

esd electronics develops and manufactures hardware and software for the automation industry. Special focus is given to custom-specific solutions particularly for companies in the fields of automotive and machine industry, medical technology as well as aerospace.

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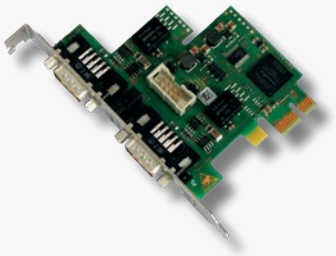
Content

Our product areas at a glance

From simple I/O module to robot controller

We offer a comprehensive portfolio of products from our in-house development for industrial automation technology. The focus is on communication with fieldbus systems such as CAN and Industrial Ethernet-based systems such as EtherCAT or PROFINET. The product range includes CAN interfaces, Gateways and I/O modules as well as hardware and software products for EtherCAT. In addition, we offer CPU boards (SBCs) and systems e.g. for VMEbus, CompactPCI or other system architectures. All products are developed in-house and manufactured under our own responsibility, so that we can ensure that the functions and features are best suited to our customers' requirements.
Based on our experience in developing and manufacturing our own products, we also offer our customers development services to solve tasks that cannot be solved with standard products.



CAN Interfaces

Advanced CAN interface products for USB, PCI Express, CompactPCI and many more. Easy to integrate, strong in performance.

EtherCAT

Software for Main(Master)-Devices, Sub(Slave)-Devices, Workbench and Subsystems

Gateways and Bridges

Gateways and Bridges for linking CAN and CANopen to industrial fieldbus systems such as PROFINET, EtherCAT and PROFIBUS-DP

I/O Modules for CAN and EtherCAT

CANopen® and EtherCAT I/O modules for high-precision measurement, actuation and control of decentralized systems.

Custom developments made to measure

With our highly qualified development teams, we offer support in solving all technical challenges in industrial automation or for anyone who needs an engineering solution. We advise, train on professional engineering topics and realize complex hardware and software according to the requirements of our customers. As a full-service provider, we offer development, manufacturing and quality assurance from a single source.

Networking

Switches and Network Selectors for industrial environments for fast and variable networking. Complex in performance, simple in application.

Slot card systems

CPU, I/O and interface cards for VME, CompactPCI, CompactPCI Serial as a robust, industry-standard and versatile solution.

CPU Boards und Modules

Industrial computers in the form of CPU Mazzanine Cards, SBCs and DIN rail modules. For control and regulation of real-time applications or as soft PLC.

Software

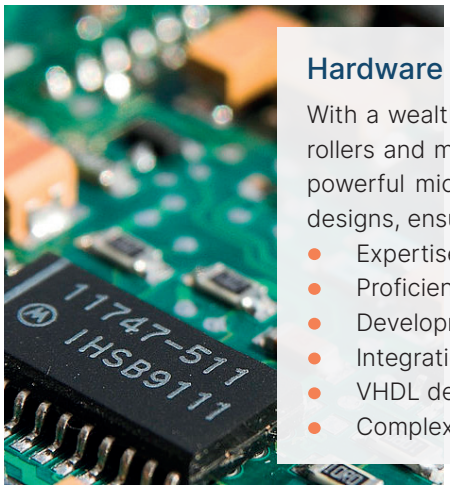
Software Stacks and Applications for CAN and EtherCAT to get the best out of the technology and hardware.

esd.eu/p002

Customized Electronics Solutions

Custom developments made to measure

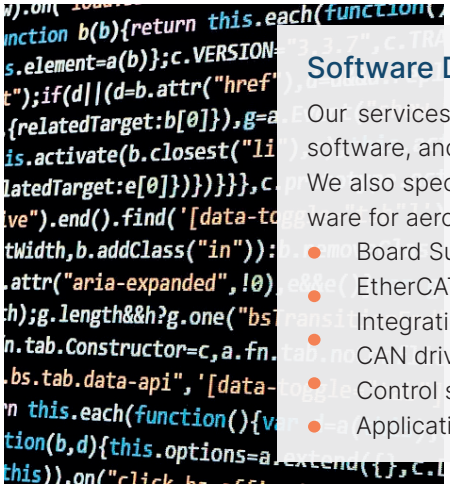
Rely on our more than 35 years of experience in the development of complex electronics, especially in the automotive, mechanical engineering, medical technology and aerospace sectors. Our team of highly qualified hardware and software developers is happy to turn any specifications into reality. Whether a customized automation solution or a tailor-made adaptation of our standard products is required, our expertise ensures that together we will find the perfect solution for any application.



Hardware Development

With a wealth of experience in developing state-of-the-art single-board computers, controllers and modules, our expertise spans a multitude of industries. We excel in integrating powerful microcontrollers and processors, standard interfaces, FPGA solutions, and PCB designs, ensuring innovative and reliable solutions for our clients.

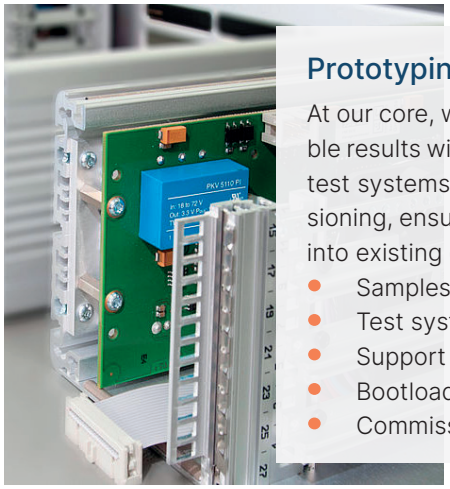
- Expertise in SBCs, controllers, I/O modules, and operating units
- Proficiency in PowerPC, ARM, and other microcontrollers/processors
- Development according to safety standards (IEC 61508) and mining approval (BVS)
- Integration of standard interfaces (EtherCAT, CompactPCI, etc.)
- VHDL development for FPGAs (Xilinx, Intel, Efinix, Lattice)
- Complex PCB design (up to 12 layers, micro vias, flex boards and others)



Software Development

Our services encompass the development of Board Support Packages, real-time control software, and integration of industrial Ethernet protocols to optimize the industrial systems. We also specialize in designing and implementing comprehensive test and simulation software for aerospace, marine, and test bench technology.

- Board Support Packages and I/O drivers, e.g. for Linux®, VxWorks®, QNX®, OS-9®
- EtherCAT support with Master Stack and Slave Stack as well as our Workbench
- Integration of industrial Ethernet protocols (PROFINET, Ethernet/IP, Modbus-TCP)
- CAN drivers for almost all hardware platforms, stacks e.g. for CANopen®, J1939
- Control software for special purpose machines according to specifications
- Application programming for real-time systems



Prototyping

At our core, we specialize in accelerating innovation with rapid prototyping, delivering tangible results within just 3-4 months of project initiation. Our comprehensive services extend to test systems development, certification support, bootloader creation, and on-site commissioning, ensuring the projects are not only efficiently realized but also seamlessly integrated into existing operations.

- Samples in many cases are ready 3 - 4 months after the start of the design
- Test systems for validation and functional tests
- Support for certifications and type tests (environment, climate, etc.)
- Bootloader and board support packages for Linux and RealTime-OS
- Commissioning and training at customer site

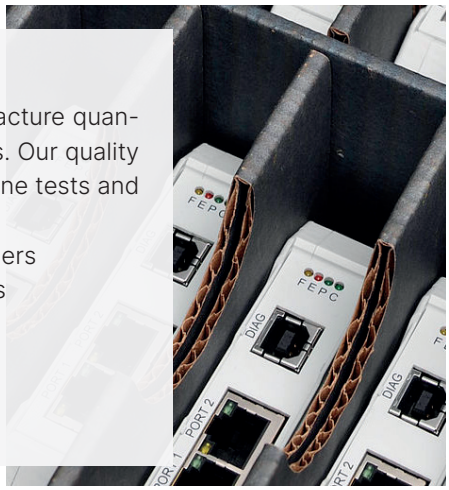
Custom developments have numerous advantages

- Time to market shorter through the use of proven function blocks
- Redesigns can be carried out quickly and cost-effectively
- Series costs optimized by reduction to the required functionality
- Availability ensured with component stocking for up to 10 years

Series Production

When it comes to serial production, we offer customized solutions and manufacture quantities of 10 to 10,000 units per year as part of strategic partnerships with OEMs. Our quality assurance includes 100% functional testing, in-house development of end-of-line tests and careful archiving of test protocols for at least a decade.

- Serial production in quantities from 10 to 10,000 units/year with OEM partners
- 100% functionality testing of all products, development of end-of-line tests
- Archiving of test protocols for at least 10 years
- Continuous optimization of series costs
- Stocking of EOL components to ensure availability



Lifecycle Management

Our lifecycle management and redesign services provide continuous monitoring of product status and ensure longevity and availability. We actively monitor component availability to ensure long-term deliverability and provide cost-effective redesign solutions to address challenges such as component discontinuation.

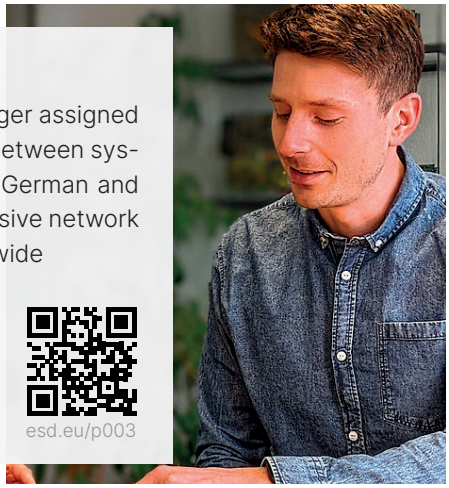
- Monitoring of the product status within the esd electronics framework of lifecycle management
- Continuous monitoring of component availability to ensure long-term supply capability
- Re-designs for cost optimization and in case of component discontinuations
- Proactive planning to prevent disruptions

Consulting and Support

As part of our consulting and support services, we offer a reliable project manager assigned to the project, dedicated and flexible contacts, and optimized communication between system design, production, and customer support. We provide documentation in German and English and have a global presence with our subsidiary in the USA and an extensive network of partners in China, Japan, Israel, France and other countries, ensuring worldwide support.

- Reliable assignment of an esd consultant for the entire project
- Dedicated and flexible contact persons in all areas
- System Design, production and customer support inhouse
- Documentation in German and/or English

esd.eu/p003



CAN Interfaces

CAN Interfaces

Due to its high data security, the CAN bus has established itself in many industries. Our wide range of CAN interfaces in many different form factors is based on the high performance IP Core esdACC, which has been developed by esd electronics.

CAN and CAN FD Technology

Background of the Technical Solutions at esd electronics

The Controller Area Network (CAN) was originally developed as a robust communication technology for use in automobiles. esd electronics has CAN experience since 1990 and is a founding member of CiA® (CAN in Automation e.V.). We participate in the technical committees of the association and regularly attend the plugfests to ensure interoperability with other manufacturers. This way we are always up to date with the latest developments and can offer products with the most current features. Thanks to our many years of experience and highly qualified experts in the field of CAN, we can also solve technically challenging tasks. We are happy to pass on our expertise and, if required, offer our customers and interested parties workshops and training courses on CAN and its optimal use in specific environments.

What are CAN classic and CAN FD?

Due to its high data security, the CAN classic has also established itself outside of the automobile after its introduction by Bosch in 1986 and has long been used in commercial vehicles, industrial automation, mechanical engineering, medical technology and aerospace as well as in safety-relevant areas. Further development to CAN FD (Flexible Data Rate) and standardization in ISO 11898-1:2015 has paved the way for high-performance CAN FD applications with speeds of up to 10 Mbit/s and 64 bytes of user data.

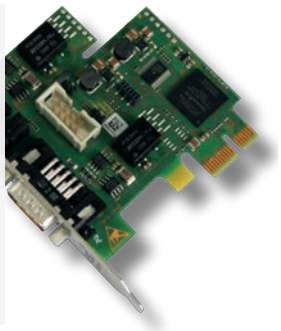
What are the benefits of CAN classic and CAN FD?

With CAN only one line/cable is required to network all communication participants. Furthermore CRC and error detection provide a high level of data security. The evolution to CAN FD provides performance improvements through higher data throughput, while maintaining the advantages of CAN classic. Due to the backward compatibility to CAN classic, CAN FD modules can be integrated into existing systems at an early stage. This makes it possible to migrate effortlessly to the advantages of CAN FD at a later date.

What products are offered by esd?

esd electronics is constantly expanding its CAN FD product range. With the new product variants CPCIserial-CAN/402, XMC-CAN/402 and PMC-CAN/402, as well as the CAN-PCIe/402, the CAN-M.2/402 and the CAN-PCIeMini/402 and additionally the CAN-USB/400 module, interfaces in different form factors and also fancy form factors with CAN FD capable interfaces are available.

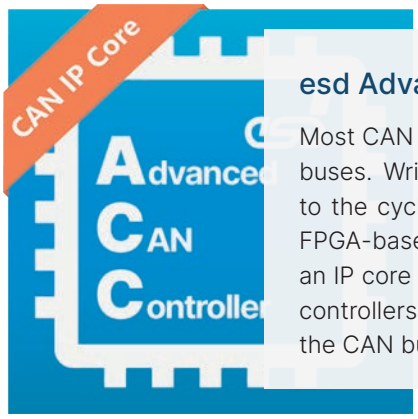
esd.eu/p004



CAN Hard- and Software by esd

esdACC and CAN 402 Series

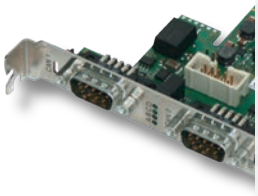
CAN is an important core technology for us, with which we have had experience for over 30 years. Based on this experience and the dedicated efforts of our qualified engineers, we have created the basis for state-of-the-art communication on the CAN bus with the esd Advanced CAN Controller (esd ACC). The esdACC is the heart of our modern CAN interfaces, which also includes the CAN 402 series. This series offers a very flexible range of applications due to a variety of possible form factors. Highly accurate timed transmission of CAN frames or the possibility to provide frames with an exact timestamp to analyze the physical reception time are only a small insight into the technical features. In addition to driver support for Windows and Linux, we also offer solutions for many common real-time operating systems such as QNX, VxWorks or RTX64.



esd Advanced CAN Controller (esdACC)

Most CAN controllers available today are connected to the host system via 8 or 16 bit wide buses. Write and especially read accesses to these controllers are very slow compared to the cycle time of modern CPUs. This is why esd developed an overall system with an FPGA-based CAN controller. The esdACC is a CAN controller implemented as an IP core in an FPGA. It overcomes the long access times of stand-alone CAN controllers by implementing a 32-bit register interface and streaming data from the CAN bus to the host CPU memory via bus master DMA.

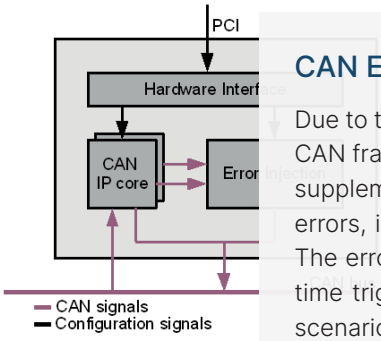
esd.eu/p058



CAN 402 Series

The CAN 402 series offers CAN interface boards for all use cases in a variety of form factors, all based on the esdACC. These cards are plug-in cards based on PCI Express and PCI for internal communication. The unified NTCAN API developed by esd to drive the CAN and CAN FD interfaces simplifies the exchange of applications between different systems. Drivers are available not only for Windows and Linux but also for real-time operating systems such as QNX, VxWorks or RTX64. Our powerful CAN tools for Windows support development, test and diagnostics.

esd.eu/p059



CAN Error Injection

Due to their principle, the CAN controllers available on the market are not able to send faulty CAN frames or to violate the CAN standard ISO 11898 in general. The esdACC CAN IP-Core, supplemented by the Error Injection Unit, can not only generate or simulate almost all CAN errors, it can even interactively intervene in the ongoing CAN communication. The error injection unit has different injection modes, such as CAN arbitration, time triggered or pattern matching, which in combination allow even complex scenarios.

esd.eu/p060

CAN-USB/2, CAN USB/3-FD

USB 2.0 Modules with CAN or CAN FD Interface

CAN-USB/3-FD

Whether for control, service, commissioning or a laboratory environment, the CAN USB module makes it easy to transfer data between CAN / CAN FD and USB 2.0. With CAN FD, data rates of up to 8 Mbit/s can be transmitted with the USB 2.0 interface in use being designed for 480 Mbit/s. The module has a solid and small aluminum housing with status LEDs in the front and is powered by the USB port. It features CAN messages to be sent with time stamps in a resolution of 1µs. In conjunction with analysis tools, the CAN module supports silent mode.

Mounted CAN-USB/2-DINrail

View at USB connector

Product Highlights

- USB 2.0 high-speed interface with data rates of 480 Mbit/s
- Robust continuous cast aluminium housing
- Free software drivers for Windows® and Linux®, with optional support for real-time operating systems.
- Higher CAN layer protocols (for CAN classic application) available: CANopen, J1939
- Comprehensive protocol support and diagnostic capabilities for seamless integration.

Software

Please find more details about the available software with NTCAN-API for esd CAN and CAN FD Interfaces on page 23.

Technical Data

CAN bit rate	CAN-USB/3-FD: up to 8 Mbit/s CAN-USB/2: up to 1 Mbit/s
USB	USB 2.0, high-speed 480 Mbit/s
Electrical isolation	Yes
Dimensions	55 mm x 54 mm x 25 mm (w/o connectors)
Power supply	via USB: 5V, Imax = 250 mA
Ambient temperature	0 °C ... +50 °C

Order Items

Designation	Order No.
CAN-USB/3-FD USB 2.0 module with CAN FD	C.2076.62
CAN-USB/3-FD-DINrail CAN-USB/3-FD for DIN rail mounting	C.2076.63
CAN-USB/2 USB 2.0 module with CAN	C.2066.02
CAN-USB/2-DINrail CAN-USB/2 for DIN rail mounting	C.2066.03

Scope of Delivery

- Free drivers for Windows.
- USB cable 1.0 m.

Product Page

esd.eu/p005

CAN-USB/400

2x CAN (FD) (Layer 2, CANopen®, J1939 oder ARINC 825, IRIG-B Input)

Experience seamless CAN communication via USB with the CAN-USB/400. Attached to USB via FIFO's and powered by the cutting-edge esd Advanced CAN Core (esdACC), our device ensures minimum latency. Notably, our interface stands out with the special Error Injection feature, enabling simulation of error conditions on the CAN bus. Inject custom bit patterns into any live CAN bus, thanks to multiple trigger conditions and modes. Discover the power of CAN-USB/400 with IRIG-B and more technical highlights.

CAN-USB/400-FD

CAN-USB/400 IRIG-B

View at IRIG-B and USB connectors

Product Highlights

- Two CAN or CAN FD interfaces for versatile communication
- IRIG-B version with analog and RS-485 IRIG-B inputs
- IRIG-B version with 2x trigger I/Os, sync. RS-485 and 4x custom I/Os
- Free CAN level 2 software drivers for Windows.
- Comprehensive protocol support and diagnostic capabilities for seamless integration.

Software

Please find more details about the available software with NTCAN-API for esd CAN and CAN FD Interfaces on page 23.

Technical Data

CAN bit rate	CAN classic modules: up to 1 Mbit/s CAN FD module: up to 8 Mbit/s
USB	USB 2.0, high-speed 480 Mbit/s
I/Os (C.2069.06 only)	analog + RS-485: IRIG-B 3.3V LVTTL I/O: 2x trigger, 4x misc.
Electrical isolation	Yes
Dimensions	86 mm x 19 mm x 86 mm (w/o connectors)
Ambient temperature	0 °C ... +50 °C

Order Items

Designation	Order No.
CAN-USB/400 2x CAN	C.2069.04
CAN-USB/400-FD 2x CAN FD	C.2069.64
CAN-USB/400 IRIG-B 2x CAN, 1x IRIG-B, I/Os	C.2069.06
CANopen object licences CANopen-LCD Windows®	C.1101.06
J1939 stack for Windows J1939-LCD Windows	C.1130.10

Scope of Delivery

- Free drivers for Windows.
- USB cable 1.0 m.

Product Page

esd.eu/p006

CAN-USB/Micro

Small CAN classic to USB Interface

The compact CAN-USB/Micro interface is designed to fit snugly into a DSUB9 enclosure. This CAN interface draws power directly from USB, providing convenience and efficiency. Embracing USB 2.0 full-speed interface, it provides USB data rates up to 12 Mbit/s. Enjoy hassle-free installation with included CAN layer 2 drivers for both Windows® and Linux®. Program the CAN-USB/Micro using the NTCAN-API, compatible with all esd CAN interfaces. Harness existing applications, CAN protocol stacks (e.g. CANopen®, J1939), and our powerful CAN tools (e.g. CANreal) directly.

Product Highlights

- Die cast robust metal case with status LEDs Powered via USB
- USB 2.0 full-speed interface
- Free software drivers for Windows and Linux, with optional support for real-time operating systems.
- Time stamped CAN messages with a resolution of 1µs

Software

Please find more details about the available software with NTCAN-API for esd CAN and CAN FD Interfaces on page 23.

Technical Data

CAN bit rate	up to 1 Mbit/s
USB	USB 2.0 full-speed, 12 Mbit/s
Electrical isolation	No
Dimensions	35 mm x 15 mm x 45 mm USB cable: 1.3 m
Power supply	via USB: 5V, Ityp = 50 mA
Ambient temperature	0 °C ... +50 °C

Order Items

Designation	Order No.
CAN-USB-Micro USB 2.0 (full-speed), 1x CAN	C.2068.02

Scope of Delivery

- Free drivers for Windows and Linux.
- USB cable.

Product Page

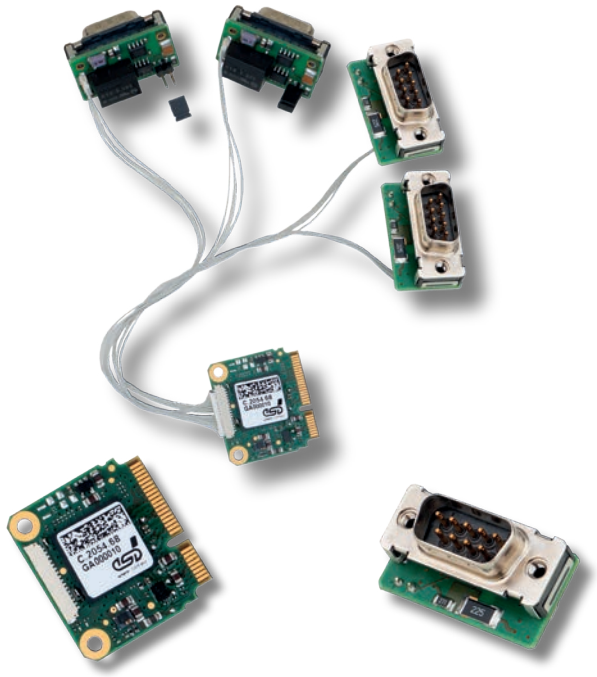
esd.eu/p007

CAN-PCIeMiniHS/402

Half-Size PCI Express® Mini Card with 4 CAN FD Interfaces

With its small form factor, this card effortlessly fits into the tiniest casings, saving valuable space. Unlock unparalleled connectivity with 4 CAN FD interfaces, easily accessible via optional DSUB9 adapters. For extreme ambient temperature environments, we offer the extended temperature version. Boost overall system efficiency with the integrated bus mastering unit (first-party DMA), ensuring lightning-fast data transfers even at high rates. Perfectly designed for hypervisor environments, our board features MSI (Message Signaled Interrupts) technology.

CAN-PCIeMiniHS/402 with optional DSUB9 adapter



CAN-PCIeMiniHS/402

CAN-Mini/402-DSUB9-ISOL (C.2054.10)

Product Highlights

- Four CAN FD interfaces
- Efficient data transfer with FPGA handling bus mastering.
- Free software drivers for Windows® and Linux®, with optional support for real-time operating systems.
- Comprehensive protocol support and diagnostic capabilities for seamless integration.
- Optional version for extended operating temperature range (-40° C ... +85° C) available

Software

Please find more details about the available software with NTCAN-API for esd CAN and CAN FD Interfaces on page 23.

Technical Data

CAN FD bit rate	10 Kbit/s up to 8 Mbit/s
Electrical isolation	Yes
Dimensions	30 mm x 27 mm halfsize PCI Express Mini Card
Power supply	3.3 V Imax = 300 mA, Ityp = 220 mA
Ambient temperature	Standard range: 0 °C ... +75 °C Extended range: -40 °C ... +85 °C
CAN controller	esd Advanced CAN Controller (esdACC), ISO 16845:2004 certified
Optional Adapter	DSUB9, socket pins, CAN termination jumper, galvanic isolation

Order Items

Designation	Order No.
CAN-PCIeMiniHS/402-4-FD 4x CAN FD Interface	C.2054.68
CAN-PCIeMiniHS/402-4-FD-T Version with extended temperature range	C.2054.69
CAN-Mini/402-DSUB9-ISOL DSUB9 adapter with galvanic isolation	C.2054.10

Scope of Delivery

- Free drivers for Windows and Linux
- CAN-Mini/402-4-Cable-150mm (C.2054.14)

Product Page

esd.eu/p008

CAN-PCIeMini/402

PCI Express® Mini card with 2 CAN or alternatively 2 CAN FD interfaces

CAN-PCIeMini/402 with two optional DSUB9 adapters

CAN-PCIeMini/402-2 (C.2044.04)
2x CAN-Mini/402-DSUB9-15cm (C.2044.10)

Experience seamless and reliable CAN/CAN FD communication with our Single Lane PCIe Mini Card with FPGA. This compact yet powerful solution features 2 interfaces, FPGA-driven bus mastering, and MSI support for efficient data transfer. With extensive OS compatibility, advanced diagnostics, and ISO-certified esdACC technology, it ensures high-quality performance. Benefit from high-resolution hardware timestamps and a rugged design suitable for extended temperature ranges. Elevate the connectivity with this versatile mini card.

Product Highlights

- Supports two CAN or optional CAN FD interfaces for versatile communication
- Efficient data transfer with FPGA handling bus mastering
- Free software drivers for Windows® and Linux®, optional support for real-time operating systems
- Comprehensive protocol support and diagnostic capabilities for seamless integration
- Extended temperature range (-40°C to +85°C) ensures reliable performance in harsh environments

Software

Please find more details about the available software with NTCAN-API for esd CAN and CAN FD Interfaces on page 23.

Technical Data

CAN / CAN FD bit rate	10 Kbit/s up to 8 Mbit/s
Electrical isolation	Yes
Dimensions	30 mm x 51 mm Full-Mini Card Type F2
Power supply	3.3 V Imax = 300 mA, Ityp = 220 mA
Ambient temperature	Standard range: 0 °C ... +75 °C Extended range: -40 °C ... +85 °C
CAN controller	esd Advanced CAN Controller (esdACC), ISO 16845:2004 certified

Order Items

Designation	Order No.
CAN-PCIeMini/402-2 CAN classic Interface	C.2044.04
CAN-PCIeMini/402-2-FD CAN FD Interface	C.2044.64
CAN-PCIeMini/402-2-FD-T Version with extended temperature range	C.2044.65
CAN-Mini/402-DSUB9-15cm Adapter cable for 1x CAN on DSUB9	C.2044.10
CAN-Mini/402-Cable Adapter cable 150mm	C.2044.14

Scope of Delivery

- Free drivers for Windows and Linux

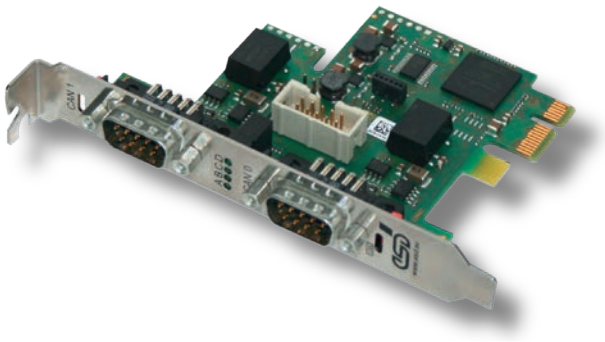
Product Page

esd.eu/p009

CAN-PCIe/402

PCI Express® Board with up to 4 CAN or CAN FD Interfaces

Expansion of PCs or workstations of all designs with PCIe slots, whether full or low profile. The CAN-PCIe/402 is a PC plug-in card for the PCI Express bus (PCIe) and is available with up to 4 galvanically isolated CAN or CAN FD interfaces according to ISO11898-2. The plug-in card is ideal for use in PCs or workstations and offers extensive driver support for a wide range of (real-time) operating systems. The card is available in various configurations so that there is a suitable solution for almost every requirement.



Product Highlights

- Multiple variants available with up to 4x CAN or CAN FD interface
- CAN bit rates from 10 Kbit/s up to 8 Mbit/s
- Bus mastering and local data management via bus master engine in CAN controller (esdACC)
- Flexible interrupt routing through MSI support (Message Signaled Interrupts)
- CAN termination on the board settable via jumpers
- Free software drivers for Windows® and Linux®, with optional support for real-time operating systems.
- Comprehensive protocol support and diagnostic capabilities for seamless integration.

Technical Data

CAN / CAN FD bit rate	10 Kbit/s up to 8 Mbit/s
Count of CAN / CAN FD Interfaces	Up to 4 Interfaces
Electrical isolation	Yes
Dimensions	PCI Express card, Low Profile PCI Express card
PCI Express	PCI Express Spec. R1.0a, Link width 1x
Power supply	3.3 V: 2x CAN Imax = 280 mA, 4x CAN Imax = 290 mA 12 V: 2x CAN Imax = 180 mA, 4x CAN Imax = 230 mA
Ambient temperature	0 °C ... +75 °C
CAN controller	esd Advanced CAN Controller (esdACC), ISO 16845:2004 certified 80 Mhz
Max. CAN Bus Load	Up to 100 %
CAN connector style	9-pin DSUB per CAN channel or 1x 37-pin DSUB (4 CAN channels), pin contacts

Powerful CAN Interface for PCs driven by esdACC

The CAN-PCIe/402 is based on the esdACC (esd Advanced CAN Controller), as are all CAN interfaces of the 402 and 400 series. The CAN controller developed by esd electronics offers a wide range of functions that go beyond the simple transmission and reception of CAN frames. In addition to reliable communication without frame loss even at a bus load of up to 100%, it provides error information and detailed bus statistics about the connected CAN bus. Advanced functions such as time stamping of Rx and Tx also help with time-accurate communication. For more information on the esdACC, please refer to page 8.

For more information, downloads and data sheets, please visit our website.

Product Page

esd.eu/p010

Product Options of CAN-PCIe/402

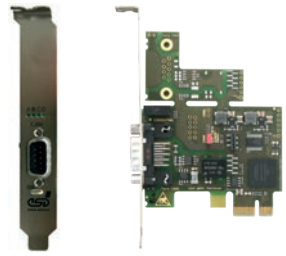
All available configurations at a glance

Single Channel Card as Low Profile

Low-profile single channel CAN classic (CAN FD optional) with the option of one channel expansion with CAN-PCIe/402-1-LP2 adapter.

CAN:
CAN-PCIe/402-1-LP
Order No.: C.2045.32
CAN FD:
CAN-PCIe/402-1-LP-FD
Order No.: C.2045.92

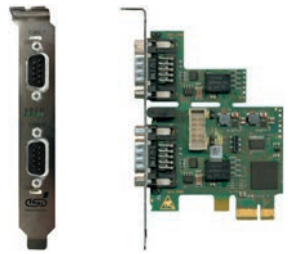
Single Channel Card as Full Profile



Single channel CAN classic (CAN FD optional) for standard PC housings.

CAN:
CAN-PCIe/402-1
Order No.: C.2045.02
CAN FD:
CAN-PCIe/402-1-FD
Order No.: C.2045.62

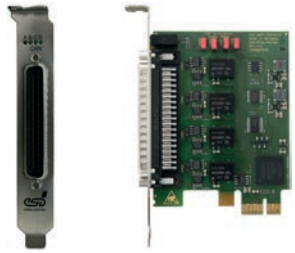
Dual Channel Card



Option with 2 CAN / 2 CAN FD interfaces with possibility of extension to 4 interfaces by means of an adapter (CAN classic only).

CAN:
CAN-PCIe/402-2
Order No.: C.2045.04
CAN-PCIe/402-4/1Slot
Order No.: C.2045.06
CAN FD:
CAN-PCIe/402-2-FD
Order No.: C.2045.64

Quad Channel Card



Solution for 4 CAN / 4 CAN FD interfaces in a single PCI Express slot. Adapter cable for connecting DSUB37 to DSUB9 available as accessory.

CAN:
CAN-PCIe/402-B4/1Slot
Order No.: C.2045.08
CAN FD:
CAN-PCIe/402-B4-FD
Order No.: C.2045.68
Adapter Cable:
CAN-PCI/4XX-B4-1C4
Order No.: C.2041.18

Extension for Dual Channel Card

Adapter for two additional CAN channels for CAN-PCIe/402-2 (CAN classic only)

CAN-PCIe/402-Slot2
Order No.: C.2045.12

Extension for Single Channel Card

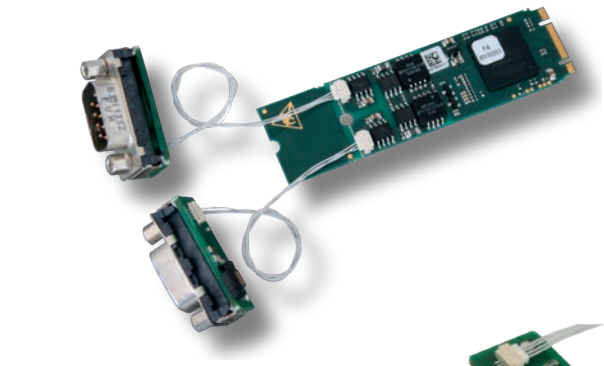
Adapter for an additional CAN Channel for CAN-PCIe/402-1-LP

CAN-PCIe/402-1-LP2
Order No.: C.2045.32
CAN-PCIe/402-1-LP2-FD
Order No.: C.2045.94

CAN-M.2/402

M.2 PCIe Card with 2 CAN FD Interfaces

CAN-M.2/402-2-FD with two optional DSUB9 adapters



CAN-M.2/402-2-FD (C.2074.64)

2x CAN-Mini/402-DSUB9-15cm (C.2044.10)

The slim form factor makes this plug-in card the ideal extension for mobile or mini computers. With 2 CAN FD interfaces and FPGA-driven bus mastering, it delivers lightning-fast data transfer and robust local data management. For extreme ambient temperature environments, we offer the extended temperature version. When precision matters most, rely on our 64-bit hardware timestamps.
Our card offers extended OS support, free Windows® and Linux® software drivers, optional real-time OS drivers. It features the esd Advanced CAN Core (esdACC) technology.

Product Highlights

- Two CAN FD interfaces
- Efficient data transfer with FPGA handling bus mastering.
- Free software drivers for Windows® and Linux®, with optional support for real-time operating systems.
- Comprehensive protocol support and diagnostic capabilities for seamless integration.
- Optional version for extended operating temperature range (-40° C ... +85° C) available

Software

Please find more details about the available software with NTCAN-API for esd CAN and CAN FD Interfaces on page 23.

Technical Data

CAN FD bit rate	10 Kbit/s up to 8 Mbit/s
Electrical isolation	Yes
Dimensions	22 mm x 60/80 mm x 4.4 mm 2280 or 2260 form factor
Power supply	3.3 V Imax = 320 mA, Ityp = 270 mA
Ambient temperature	Standard range: 0 °C ... +75 °C Extended range: -40 °C ... +85 °C
CAN controller	esd Advanced CAN Controller (esdACC), ISO 16845:2004 certified
Optional Adapter	DSUB9, socket pins, CAN termination jumper, 150 mm cable

Order Items

Designation	Order No.
CAN-M.2/402-2-FD 2x CAN FD Interface	C.2074.64
CAN-PCIeMini/402-DSUB9 1x adapter DSUB9 inclusive cable 150 mm	C.2044.10
CAN-PCIeMini/402-Cable Cable only, 150 mm	C.2044.14

Scope of Delivery

- Free drivers for Windows and Linux

Product Page

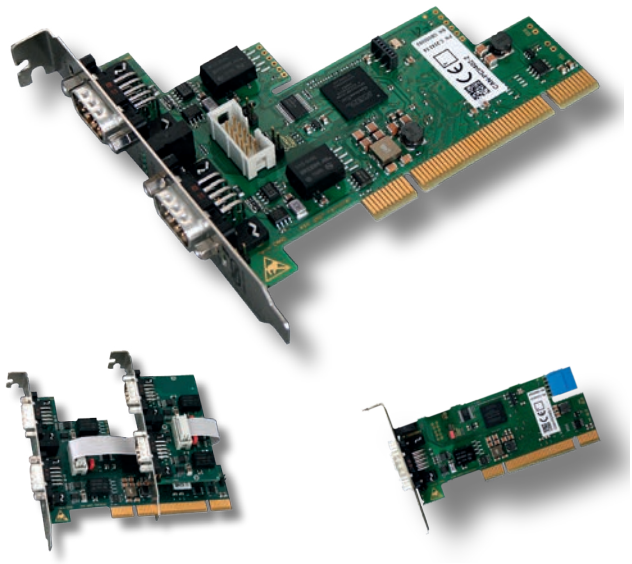
esd.eu/p011

CAN-PCI/402

PCI card with 1 to 4 CAN or 2 CAN FD interfaces

CAN-PCI/402-2 / CAN-PCI/402-2-FD

This PCI board features one, two or four electrically isolated high-speed CAN classic interfaces with DSUB9 connectors. For CAN FD applications a two-channel version is available.
Boost overall system efficiency with the integrated bus mastering unit (first-party DMA), ensuring lightning-fast data transfers even at high rates. Perfectly designed for hypervisor environments, our board features MSI (Message Signaled Interrupts) technology. When precision matters most, rely on our 64-bit hardware timestamps.



CAN-PCI/402-4/2Slot

CAN-PCI/402-1-LP

Product Highlights

- 1, 2 or 4 CAN interfaces or 2 CAN FD interfaces
- Efficient data transfer with FPGA handling bus mastering.
- Free software drivers for Windows® and Linux®, with optional support for real-time operating systems.
- Comprehensive protocol support and diagnostic capabilities for seamless integration.
- Low profile version for 1x CAN

Software

Please find more details about the available software with NTCAN-API for esd CAN and CAN FD Interfaces on page 23.

Technical Data

CAN/CAN FD bit rate	CAN: up to 1 Mbit/s CAN FD: up to 8 Mbit/s
Electrical isolation	Yes
Dimensions	PCI card, Low Profile PCI card, adapter board
Power supply	3.3 V, 2x CAN Imax = 700 mA 4x CAN Imax = 1.1 A
Ambient temperature	0 °C ... +75 °C
CAN controller	esd Advanced CAN Controller (esdACC), ISO 16845:2004 certified

Order Items

Designation	Order No.
CAN-PCI/402-2-FD 2x CAN FD Interface	C.2049.64
CAN-PCI/402-1 1x CAN Interface	C.2049.02
CAN-PCI/402-2 2x CAN Interface	C.2049.04
CAN-PCI/402-4/2Slot 4x CAN Interface, 2 slots	C.2049.06
CAN-PCI/402-1-LP 1x CAN Interface, PCI low profile	C.2049.32

Scope of Delivery

- Free drivers for Windows and Linux

Product Page

esd.eu/p012

CAN/402-Slot2-LIN

2-Channel LIN Extension for CAN FD Boards of the CAN 402 Series

As an extension for the esd CAN-PCIe/402-2-FD and CAN-PCI/402-2-FD boards, the CAN/402-Slot2-LIN adapter board provides the physical layers of two additional LIN interfaces. They are accessible via DSUB9 connectors in the separate slot bracket of the extension board. Thanks to the LIN extension, CAN and LIN go hand in hand. In addition to the esdACC CAN cores the compatible esd CAN FD boards carry LIN IP cores within the esdACC. This allows to use CAN and LIN in parallel and to take advantage of the bus mastering implemented in the hardware and the drivers.

Product Highlights

- Usable with CAN-PCI/402-2-FD and CAN-PCIe/402-2-FD
- LIN interfaces: Physical layer according to ISO 17987-4:2016
- LIN Master and Slave work modes
- Software switchable LIN Master pull-up resistors
- Automatic detection of the LIN adapter, Automatic bit rate detection and resynchronisation

Software

LIN drivers for Windows/Linux come with CAN-PCI/402-2-FD and CAN-PCIe/402-2-FD free of charge.

Technical Data

LIN bit rate	up to 20 Kbit/s
Electrical isolation	Yes
Dimensions	44 mm x 80 mm x 21.6 mm
Power supply	5 VDC +/-5%
Ambient temperature	0 °C ... +75 °C

Order Items

Designation	Order No.
CAN/402-Slot2-LIN 2 LIN interfaces via DSUB9	C.2045.12

Scope of Delivery

- Ribbon cable

Product Page

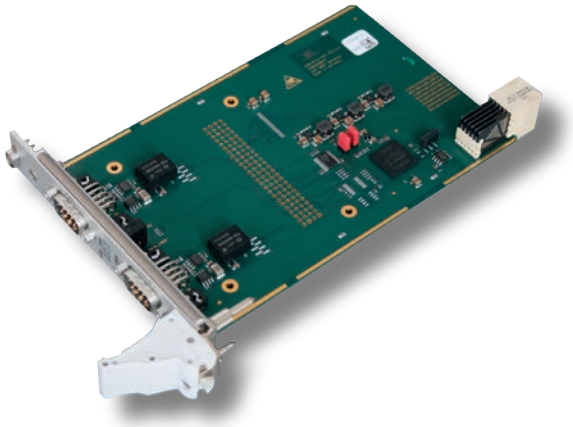
esd.eu/p013

CPCIserial-CAN/402

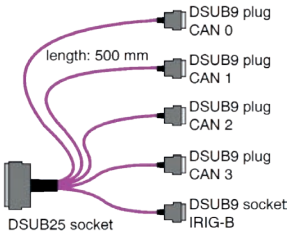
CompactPCI® Serial (PCIe®) Board with 2 or 4 CAN FD interfaces, optional IRIG-B

This CompactPCI serial card features up to four CAN FD interfaces. The four-channel card is additionally available as a special version with IRIG-B input. With the integrated bus mastering unit (first-party DMA) that enables fast data transfers even at high rates, the efficiency of the overall system is increased. The board is designed for hypervisor environments and incorporates MSI (Message Signaled Interrupts) technology. For precise data handling, utilize our 64-bit hardware timestamps, ensuring accurate reception and transmission of CAN messages.

CPCIserial-CAN/402-2-FD



CPCIserial-CAN/402-4-FD



Adapter CAN/400-4-1C5

Product Highlights

- Two or four CAN FD interfaces
- Efficient data transfer with FPGA handling bus mastering.
- Free software drivers for Windows® and Linux®, with optional support for real-time operating systems.
- Comprehensive protocol support and diagnostic capabilities for seamless integration.
- Four channel version available with IRIG-B input, customization on request.

Software

Please find more details about the available software with NTCAN-API for esd CAN and CAN FD Interfaces on page 23.

Technical Data

CAN / CAN FD bit rate	10 Kbit/s up to 8 Mbit/s
Electrical isolation	Yes
Dimensions	3 U / 4 HP, compliant to IEEE 1101
CPCI serial bus	PICMG CPCI-S.0 Rev. 1.0, PCI Express Rev. 1.0a, Link width 1x
Ambient temperature	0 °C ... +75 °C
CAN controller	esd Advanced CAN Controller (esdACC), ISO 16845:2004 certified

Order Items

Designation	Order No.
CPCIserial-CAN/402-2-FD 2x CAN FD via 2x DSUB9	I.3001.64
CPCIserial-CAN/402-4-FD 4x CAN FD via DSUB25	I.3001.68
CPCIserial-CAN/402-4-FD-IRIG-B as I.3001.68, + IRIG-B input	I.3001.69
CAN/400-4-1C4 Adapter DSUB25 to 4x DSUB9 (for I.3001.68)	C.2047.19
CAN/400-4-1C5 Adapter DSUB25 to 5x DSUB9 (for I.3001.69)	C.2047.18

Scope of Delivery

- Free drivers for Windows and Linux

Product Page

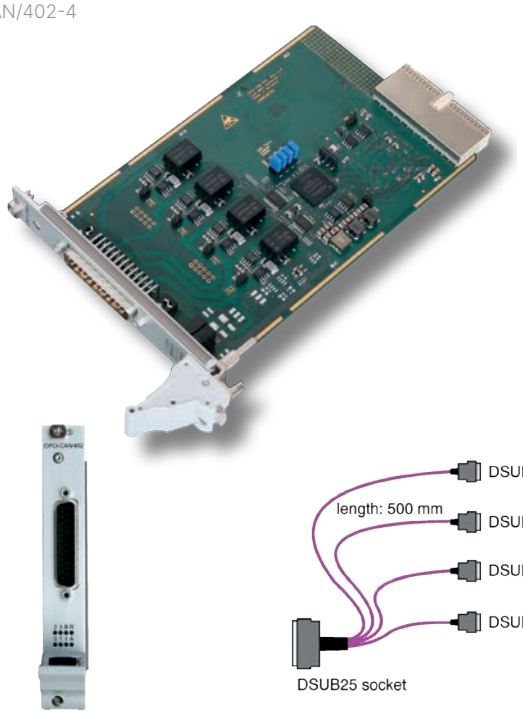
esd.eu/p014

CPCI-CAN/402

CompactPCI® Board with 4 CAN FD Interfaces

This CompactPCI card with four CAN FD interfaces accessible via a DSUB25 connector enables the integration of an industrial computer into a CAN network. Enhance system efficiency with the integrated bus mastering unit (first-party DMA), enabling fast data transfers even at high rates. The board is designed for hypervisor environments and incorporates MSI (Message Signaled Interrupts) technology. For precise data handling, utilize our 64-bit hardware timestamps, ensuring accurate reception and transmission of CAN messages.

CPCI-CAN/402-4



Front panel

Adapter CAN/400-4-1C4

Product Highlights

- Four CAN FD interfaces
- Efficient data transfer with FPGA handling bus mastering.
- Free software drivers for Windows® and Linux®, with optional support for real-time operating systems.
- Comprehensive protocol support and diagnostic capabilities for seamless integration.
- Customization on request, e.g. ext. temperature range, IRIG-B input, all signals via Rear I/O

Software

Please find more details about the available software with NTCAN-API for esd CAN and CAN FD Interfaces on page 23.

Technical Data

CAN FD bit rate	10 Kbit/s up to 8 Mbit/s
Electrical isolation	Yes
Dimensions	3 U / 4 HP, compliant to IEEE 1101
CPCI bus	PCI Local Bus Specification 3.0, 32 bit, 33/66 MHz, 3.3 V (5 V tolerant)
Ambient temperature	0 °C ... +75 °C
CAN controller	esd Advanced CAN Controller (esdACC), ISO 16845:2004 certified

Order Items

Designation	Order No.
CPCI-CAN/402-4-FD 4x CAN FD via DSUB25	I.2332.68
CAN/400-4-1C4 Adapter cable DSUB25 to 4x DSUB9	C.2047.19

Scope of Delivery

- Free drivers for Windows and Linux

Product Page

esd.eu/p015

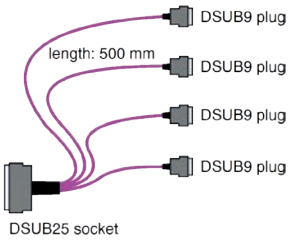
PMC-CAN/402, XMC-CAN/402

PMC/XMC card with 4x CAN FD interfaces, optional IRIG-B

PMC-CAN/402-4-FD

These PMC and XMC cards are the ideal extension for carrier boards for building modular systems. The cards feature four CAN FD interfaces accessible via a DSUB25 connector. Enhance system efficiency with the integrated bus mastering unit (first-party DMA), enabling fast data transfers even at high rates. The boards are designed for hypervisor environments and incorporate MSI (Message Signaled Interrupts) technology. For precise data handling, utilize our 64-bit hardware timestamps. Both cards are available with an optional IRIG-B input.

XMC-CAN/402-4-FD



Adapter CAN/400-4-1C4

Product Highlights

- Four CAN FD interfaces
- Efficient data transfer with FPGA handling bus mastering.
- Free software drivers for Windows® and Linux®, with optional support for real-time operating systems.
- Higher CAN layer protocols (for CAN classic application) available: CANopen, J1939, ARINC 825
- Comprehensive protocol support and diagnostic capabilities for seamless integration.

Software

Please find more details about the available software with NTCAN-API for esd CAN and CAN FD Interfaces on page 23.

Technical Data

CAN FD bit rate	10 Kbit/s up to 8 Mbit/s
Electrical isolation	Yes
Dimensions	149 mm x 74 mm x 10 mm
PMC (PCI bus) XMC (PCI Express®)	PCI 3.0, 32 bit 33/66 MHz, 3.3V/5V PCI Express R1.0a, Link width 1x
Ambient temperature	0 °C ... +75 °C, (C.2028.78: -40 °C ... +75 °C)
CAN controller	esd Advanced CAN Controller (esdACC), ISO 16845:2004 certified
IRIG-B (only C.2018.69, C.2028.69)	one IRIG-B input, analog and RS-485 interface

Order Items

Designation	Order No.
PMC-CAN/402-4-FD PMC board, 4x CAN FD via DSUB25	C.2028.68
PMC-CAN/402-4-FD-IRIG-B as C.2028.68, with additional IRIG-B	C.2028.69
PMC-CAN/402-4-FD-T as C.2028.68, but -40 °C ... +75 °C	C.2028.78
XMC-CAN/402-4-FD XMC board, 4x CAN FD via DSUB25	C.2018.68
XMC-CAN/402-4-FD-IRIG-B as C.2018.68, with additional IRIG-B	C.2018.69

Scope of Delivery

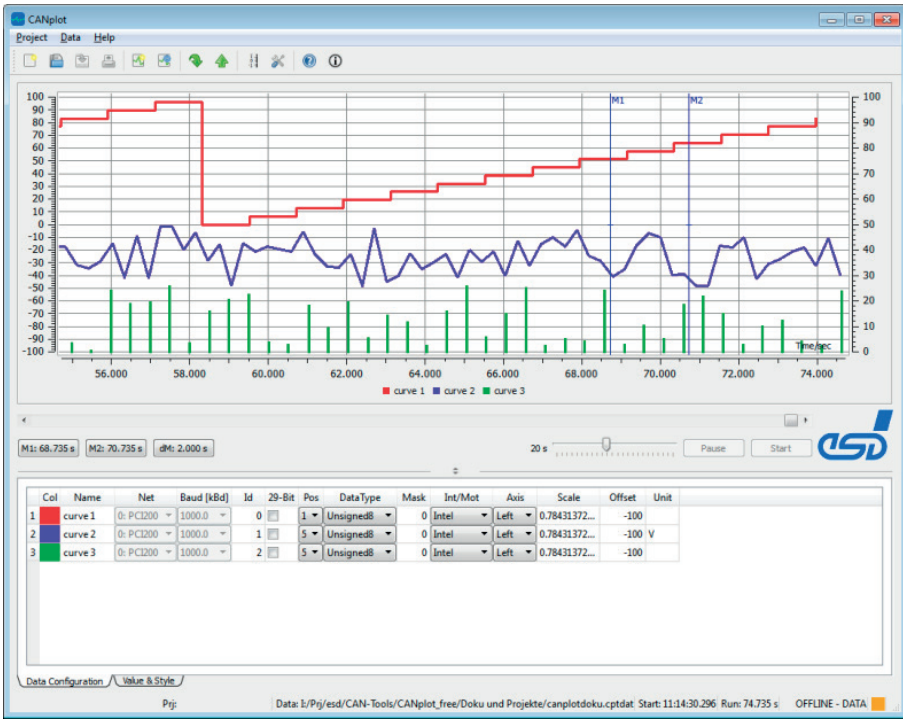
- Free drivers for Windows and Linux

Product Page

esd.eu/p016

CAN Software

CAN Software



Drivers and software stacks for our CAN interface boards are available for a wide range of operating systems. Maximum portability of application software is achieved by using esd's uniform NTCAN API.

Uniform NTCAN-API and Device Drivers for all CAN Interfaces from esd electronics

From programming customer-specific CAN applications to automating industrial processes and improving diagnostics in the automotive industry, the NTCAN-API provides the toolbox needed to easily and precisely exploit the full potential of CAN technology. Developed by esd electronics, the API is a powerful software library that enables communication over the Controller Area Network (CAN) in a variety of environments, including „hard“ real-time operating systems such as QNX or VxWorks, as well as Windows and Linux.

The NTCAN-API offers among others the following functions

- Uniform, platform independent API on all platforms and CAN interfaces
- Support for plug & play and hot-pluggable CAN devices
- Support of multitasking/multi-threading as well as multiprocessor and multicore support
- Simultaneous support of CAN classic and CAN FD

- Event-driven and/or polled CAN I/O operations
- High resolution timestamps for received/sent frames and events
- Scheduling (single shot or cyclically) of Tx messages
- Time-triggered transmission (Timestamped Tx)

- Listen-only mode for non-destructive bus monitoring
- Extended error information about the bus status
- Event-driven status and error display

- Advanced acceptance filtering for messages in basic and extended frame format
- Support for disabling automatic retransmission (also known as single-shot mode)
- LIN and GPIO support on appropriate hardware

The NTCAN API is available for the following popular operating systems

	Windows	Linux	RTX64	QNX	VxWorks	INtime
CAN 402 Series see page 12 to 21	✓	✓	✓	✓	✓	✓
CAN-USB/2 CAN-USB/Micro	✓	✓		✓		
CAN-USB/3-FD	✓	✓				
CAN-USB/400	✓					
EtherCAN/2	✓	✓				

✓ Full support of all functions available in the hardware

✓ Supported via SocketCAN

All information about features and much more can be found in the NTCAN-API Application Development Manual on our website. Drivers for more OS on request.

esd.eu/p017

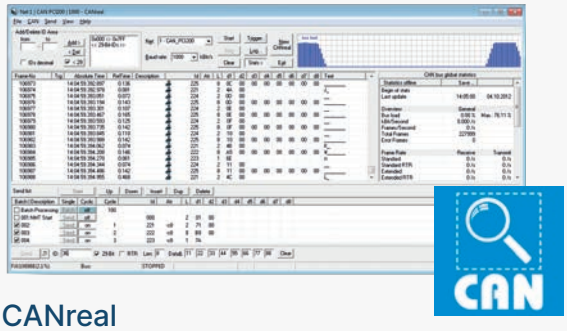
CAN Tools

Free Software Tools for esd CAN Boards

Features

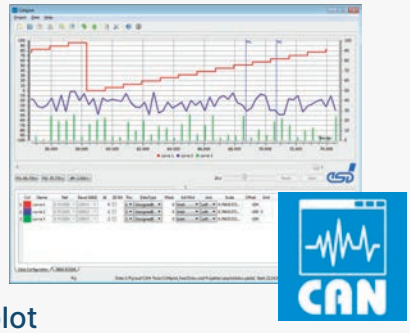
- Free-of-charge tools as part of the esd Software Development Kit (CAN SDK)
- Supports efficient setup and analysis of CAN applications and networks
- Operational with all esd PC-CAN interfaces (e.g. PCIe, USB, EtherCAN/2 ...)
- Runs under all popular Windows® 32 and 64 bit operating systems

esd.eu/p018



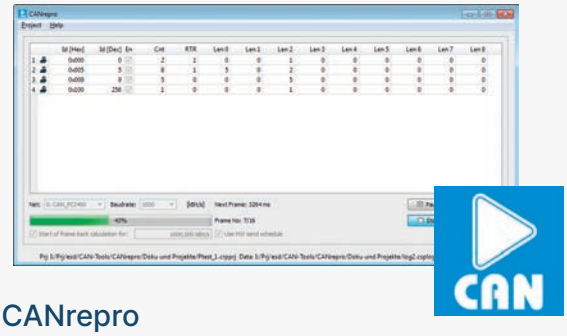
CANreal

CAN test and monitoring tool with a wide range of configuration options



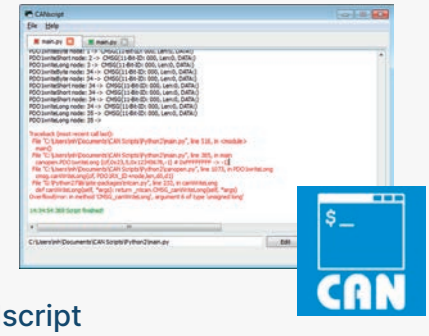
CANplot

Easy visualization of CAN data



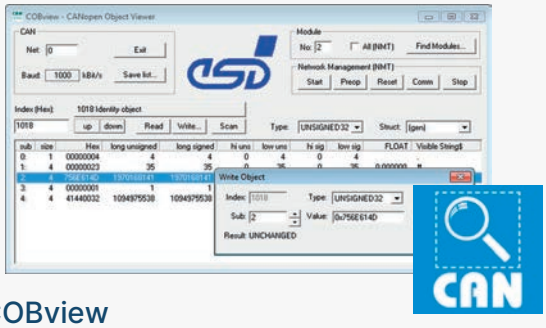
CANrepro

Playback of recorded CAN messages



CANscript

With the help of the Python scripting tool, Python scripts can be executed and managed



COBview

The CANopen Object View COBview is an effective tool for analysis and diagnosis of CANopen nodes

System Requirements

- Windows 32 bit or 64 bit system
- 30 MB free HD drive space
- esd CAN driver installed

Note: For a running CAN network at least two CAN devices are necessary.

CAN Protocol Stacks

Communication Solutions using CAN Higher Layer Protocols

Layer 2 drivers for a wide range of operating systems are available for the comprehensive range of CAN interfaces. Optimal portability is achieved by using esd's uniform NTCAN API, which is identical on all systems. Since the higher CAN protocols and the software tools are also based on this API, their use on the different platforms is also possible without any problems. The NTCAN API is included in the scope of delivery of the CAN modules.
The associated SDK (Software Development Kit) and the CAN tools for Windows are also supplied free of charge. Updates can be downloaded from the website.

CANopen Protocol Stack Library

Operating System	OSI-Layer 2 Driver	CANopen Slave Driver	CANopen Master Driver
Windows 95/98/ME	✔	✔	✔
Windows 32 + 64 bit	✔	✔	✔
Windows CE	✔	-	-
RTX / RTX64	✔	✔	✔
Linux (Preempt. Patch)	✔	✔	✔
Linux-RTAI	✔	-	-
LynxOS	✔	-	-
PowerMAX OS	✔	-	-
Solaris	✔	-	-
SGI-IRIX	✔	-	-
AIX	✔	-	-
VxWorks	✔	✔	✔
QNX	✔	✔	✔
RTOS-UH	✔	✔	✔
RMOS	✔	✔	✔
On Time RTOS-32	✔	-	-

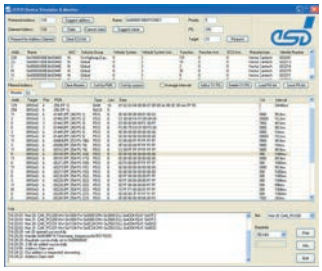
The esd CANopen protocol libraries are intended to easily extend an application with CANopen manager/slave capabilities or to develop stand-alone manager/slave devices.

- CANopen® Master/Slave for applications
- Easily extend applications with CANopen capabilities

The CANopen Protocol Stack is available for Windows, Linux, RTX, QNX, VxWorks and as Source Code

esd.eu/p019

J1939 Protocol Stack

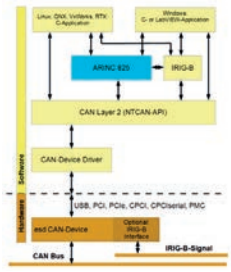


- All SAE J1939 communication mechanisms supported (except bridge function)
- Full support for the transport protocols (‚TP-BAM'/ ‚TP-CM') to transmit larger blocks of data
- Quick software development due to convenient functions: e.g. sending PGN data automatically, callback functions for incoming requests

The J1939 Protocol Stack is available for Windows, Linux, RTX and as Source Code

esd.eu/p056

ARINC 825 Standard CAN bus protocol



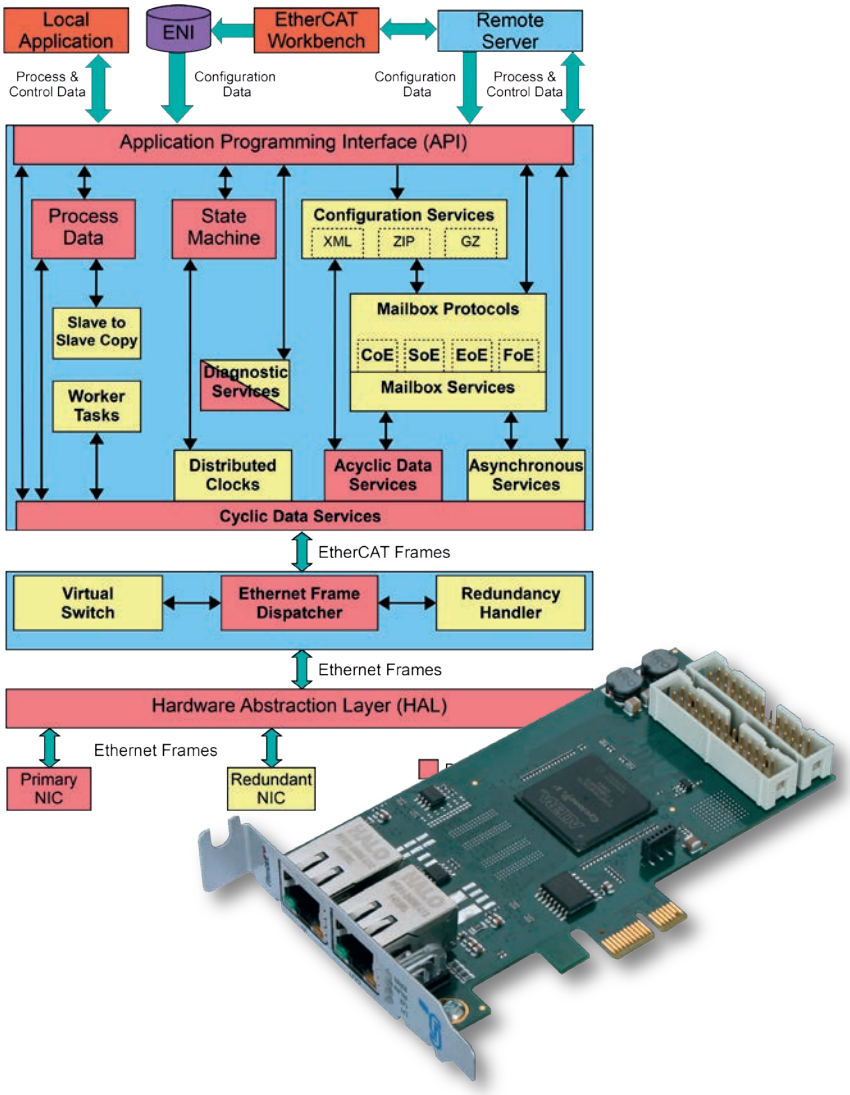
- Resolution of the transmission scheme of the minor time frames < 1 µs
- Unlimited number of minor time frames with repetition rate ≥ 2 ms
- Start of the transmission scheme at defined time
- Protocol library according to ARINC 825-4 (This version, supplement 4, includes CAN FD support)

The ARINC825 Protocol Stack is available for Windows, Linux, LabVIEW, RTX, QNX, VxWorks and as Source Code

esd.eu/p057

EtherCAT

EtherCAT



esd electronics is developing Hardware and Software for EtherCAT solutions since 2008. This includes software products like EtherCAT Master and the Workbench, standard hardware products and customer specific solutions.

EtherCAT Technology at esd

Real-time industrial Ethernet Protocol

EtherCAT® is a very flexible real-time Ethernet protocol for industrial applications described in the IEC 61158 standard. Data exchange is based on the ‚processing on the fly' principle: This means that the telegram passes through each slave device and the corresponding device takes its data. As a result, there is only a minimal delay. The data for the master are inserted into the telegram in the same way. This makes EtherCAT an excellent solution for Ethernet-based industrial control systems with many decentralized I/Os and/or cycle times of less than 100 µs.

esd.eu/p020

Development Services

esd has been developing EtherCAT Hardware and Software solutions since 2008. In addition to our standard products like EtherCAT Master, EtherCAT Workbench and EtherCAT Hardware we offer customer specific solutions. As an active member of the EtherCAT Technology Group (ETG) (www.ethercat.org) we implement engineering services for all aspects of this technology for our customers.

esd.eu/p062

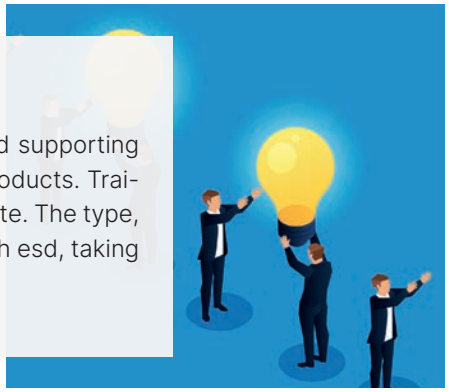
EtherCAT Products

We offer EtherCAT software and hardware products. Our hardware includes EtherCAT slave boards for various form factors. The software products include the Master, Slave and Workbench. They can be tested via demoversion for free in any system if requested.

esd.eu/p063

Trainings and Workshops

Since 2008 esd has been conducting workshops on EtherCAT technology and supporting customers in the development of optimized EtherCAT hardware or software products. Training courses can be held at esd headquarters in Hanover or at the customer's site. The type, depth and duration of the measure is determined by the customer together with esd, taking into account the requirements of his project.

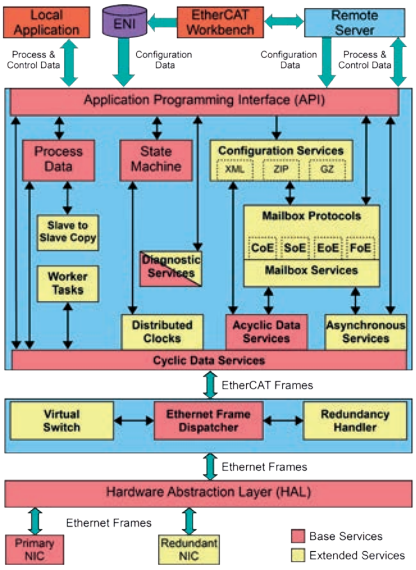


EtherCAT Master Stack

Advanced Features for Seamless EtherCAT Network Integration

The EtherCAT Master Stack is a robust but flexible software solution for seamless integration and control of EtherCAT networks. It is available for various CPU architectures and operating systems - independent of the Ethernet chip used.
The configuration of networks with ENI files is possible effortlessly as well as the optimization of data exchange with framed or packed layouts. It can be chosen of the versatile communication protocols such as CoE, EoE, FoE, SoE, AoE, and VoE. This cross-platform stack provides exceptional control and efficiency for various applications.

Structure of the EtherCAT Master



Product Highlights

- Effortlessly configure the existing EtherCAT network with ENI file support
- Enjoy a simplified programming interface for effortless integration and control of EtherCAT networks
- Enjoy comprehensive device control with CoE, EoE, FoE, SoE, AoE, and VoE support
- Detect and handle errors promptly with powerful diagnostic capabilities
- Seamless integration: Portable EtherCAT Master Stack integrates into diverse platforms and architectures

Technical Data

CPU architecture supported	x86, x64, PPC, ARM
Communication protocols	CoE, EoE, FoE, SoE, AoE, VoE
Integration	Portable across platforms
Redundancy support	Cable redundancy for uninterrupted operation
Compatibility	EtherCAT Master Class A according to ETG.1500

Order Items

Designation	Order No.
EtherCAT Master, single Single Runtime License, Multi OS support	P.4500.xx
EtherCAT Master, project Project license in connection with an EtherCAT project	P.4501.xx
EtherCAT Master, demo Free demo versions on request	P.4502.xx
Support EtherCAT Master Project Support and updates for 12 month	P.4503.10

Scope of Delivery

- Software and documentation manual as pdf file

Product Page

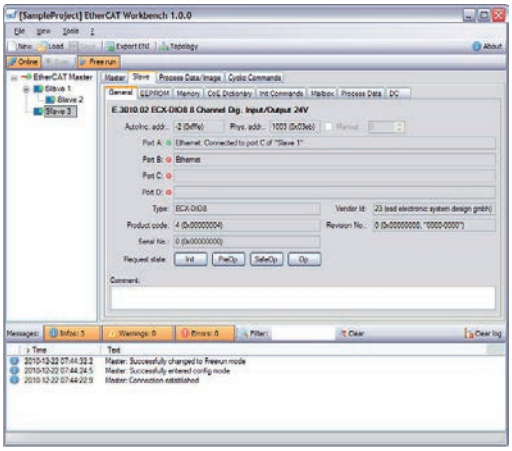
esd.eu/p021

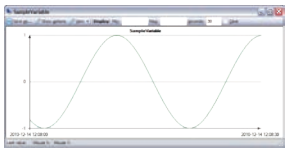
EtherCAT Workbench

EtherCAT® Network Configuration and Monitoring Tool

This tool enables the effortless creation, initialization and monitoring of EtherCAT networks, switching between offline and online modes. Our built-in EtherCAT master facilitates online topology scans, network initialization and monitoring. The exported configuration files in ENI format are compatible with various EtherCAT masters on the market. Our intuitive interface covers all aspects of EtherCAT configuration - SM, FMMU, DC setup, PDO mapping and more. Enhanced editor for ESI EEPROM data, free run mode for network control and graphical topology viewer.

Main application window





Process data monitor

Product Highlights

- Create network configuration files, initialize and monitor an EtherCAT network
- Built-in EtherCAT master to support online mode based on network topology scan
- Export of configuration files
- Sophisticated graphical network topology viewer
- Online read and write access to EtherCAT slave device register, memory and object dictionary
- Support of Python scripts in test routines

Technical Data

Software requirements	Microsoft® Windows® XP or higher, .NET Framework 2 SP2
Hardware requirements	Network interface card, screen resolution at least 1024×768
Configuration	Offline, online, SM/FMMU/DC setup and PDO mapping, ESI editor
Initializing and monitoring	Free run mode, state machine, EtherCAT slave register access
Statistics	Graphical topology, process data, statistical Ethernet/EtherCAT data
Logging	Slave CoE emergency messages, Master and Workbench events

Order Items

Designation	Order No.
EtherCAT Workbench - License Key Network configurator Win 32/64 bit systems	P.4510.01

Product Page

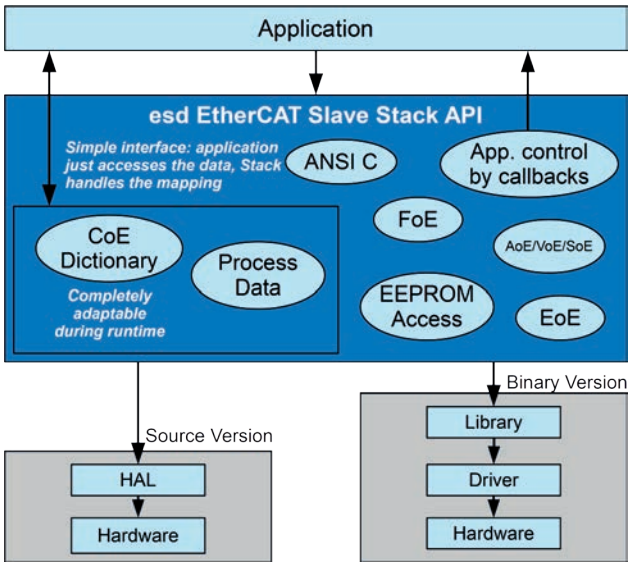
esd.eu/p022

EtherCAT Slave Stack

Software Stack for Easy Development of Embedded Slave Devices

Our ANSI-C EtherCAT slave stack enables efficient parallel development of hardware and application software. Designed for EtherCAT-compliant communication, our stack simplifies development. ANSI-C source code is available in binary versions or tested on different architectures. An API-based interface facilitates updates and hardware changes by hiding protocol details for application development. Mailbox protocols such as CoE, EoE, FoE and VoE are fully supported, with CoE handling dynamic PDO mapping, EoE Ethernet frames, FoE data chunks and VoE callbacks for mailbox packets.

Architecture overview



Product Highlights

- Significantly reducing time to market for slave development
- Services for EtherCAT-compliant Communication according to IEC as well as Support of the Mailbox Protocol
- Cross-platform API the parallel development of embedded device hardware and application software
- EtherCAT compliant communication according to IEC 61158 / ETG.1000
- Comprehensive support for object dictionary and process data

Technical Data

Source code	Completely written in ANSI C
Build	Incl. sample makefiles for gcc and project files for Visual Studio 10
Supported EtherCAT Slave Controllers (ESC)	ET1100 and compatibles, TI AM335X Sitara RTUs, Renesas R-IN32M3-EC
Mailbox protocols	CoE, EoE, FoE and VoE
Object dictionary	Dynamic dictionary, completely changeable during runtime
Conformance tests	Tested with the latest EtherCAT Conformance Test Tool
Supported operating systems	Linux, On Time RTOS-32, OS-9, QNX6/7, RTX, RTX64, VxWorks, Windows 7/8/10/11, FreeRTOS

Order Items

Designation	Order No.
EtherCAT Slave Stack (Bundle) EtherCAT Slave Stack ANSI-C source code	P.4520.01
Support EtherCAT-Slave-Stack-Source Support and updates for 12 month	P.4520.10

Scope of Delivery

- CD with documentation and sample application.

Product Page

esd.eu/p023

EtherCAT Hardware

Slave Interfaces for various systems

With these EtherCAT interface boards, various systems can be turned into EtherCAT slave devices. The boards are available for PCI Express, XMC, PMC and CompactPCI Serial form factors. The boards can be easily configured with the help of our EtherCAT Master or an EtherCAT Master from another manufacturer. Due to the simple hardware topology and the use of a „soft“ controller, the design of the boards offers maximum flexibility. If required and if a suitable quantity is purchased, we are happy to make customised adjustments to the slave boards.

ECS-PCIe/FPGA - PCI Express® EtherCAT® Slave Interface

- Extend a PCI Express system with EtherCAT Slave (ECS) functions
- The memory area of the EtherCAT slave controller is directly mapped in the PCI Express address space
- Example of an EtherCAT Slave Information File (ESI file in XML format) included

ECS-PCIe/FPGA
Order No.: E.1104.02
ECS-PCIe/FPGA-LP
Order No.: E.1106.04
esd.eu/p024

ECS-XMC/FPGA - XMC EtherCAT® Slave Interface

- Addition of EtherCAT Slave (ECS) functionality to a XMC equipped base board
- The EtherCAT Slave Controller address space is directly mapped to the PCI Express® address space
- Sample EtherCAT Slave Information File (ESI file in XML format) is provided

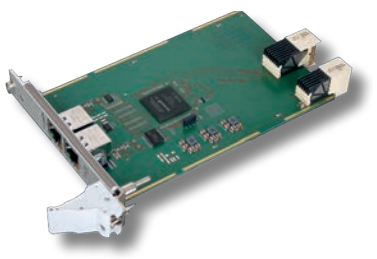
ECS-XMC/FPGA
Order No.: E.1102.02
esd.eu/p025

ECS-PMC/FPGA - PMC EtherCAT® Slave Interface

- Addition of EtherCAT Slave (ECS) functionality to a PMC equipped base board
- The EtherCAT Slave Controller address space is directly mapped to the PCI Express® address space.
- Example of an EtherCAT Slave Information File (ESI file in XML format) included

ECS-PMC/FPGA
Order No.: E.1104.02
esd.eu/p026

ECS-CPCIs/FPGA - CompactPCI® Serial to EtherCAT® slave interface



- Extention of a CompactPCI Serial system with EtherCAT Slave (ECS) functions
- The memory area of the EtherCAT slave controller is directly mapped in the CompactPCI Serial address space.
- esd EtherCAT Slave API library and sample code for a quick start into application development are included in delivery

ECS-CPCIs/FPGA
Order No.: E.1108.02
esd.eu/p027

Gateways

The gateway portfolio includes modules for data exchange from CAN and CANopen to industrial fieldbus systems such as PROFIBUS-DP, PROFINET and EtherCAT as well as bridges for coupling different segments of the same bus system.

Gateways and Bridges at esd

CAN/CANopen® to PROFIBUS®, PROFINET® or EtherCAT®

The gateway portfolio includes couplings from CAN and CANopen to industrial fieldbus systems such as PROFIBUS-DP, PROFINET and EtherCAT. Bridge functionalities for data exchange between two independent EtherCAT networks or two independent CAN segments are available.

Product Portfolio Highlights

One highlight is the new CAN-CBX-Bridge-FD which connects CAN networks with CAN FD networks.
Also remarkable is the CAN-PN/2-FD, the first PROFINET® IO to CAN FD Gateway for Fieldbus Communication in our portfolio. All our gateways and bridges can be found on our website.

esd.eu/p028

PROFINET and PROFIBUS Gateways configurable via bus

The CAN / CANopen gateways to PROFIBUS or PROFINET have in common that the modules themselves do not have to be configured externally by the user. The entire configuration and parameterization is carried out by the user program of the PLC. This makes it much easier to replace a module. Additional external tools or aids for configuring and parameterizing the gateways are therefore not required in the field.

Case Study: EtherCAT Bridge for Robots

At the CFRP NORD Research Center, the Fraunhofer Institute for Manufacturing Technology and Advanced Materials (IFAM) is working on solutions to increase the accuracy of industrial robots so that they can be used for machining large structures in aircraft construction. The ECX-EC module connects two EtherCAT segments with each other. The EtherCAT bridges contain two EtherCAT slave interfaces. They are used to integrate the EtherCAT networks so that process data can be exchanged between two EtherCAT segments. Read the complete article on our website.

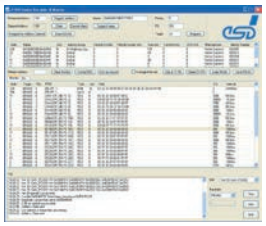
esd.eu/p029

EtherCAN/2

CAN-Ethernet Gateway

Transmit data seamlessly between CAN and 100Base-TX Ethernet. In Bridge Mode, leverage two EtherCAN/2 devices to connect two CAN nets via TCP/IP. Our integrated HTTP server allows convenient web-based configuration. For a hassle-free experience, we provide Windows® and Linux® drivers, transforming the gateway into a CAN interface on the host. Program this device using the NTCAN-API, compatible with all esd CAN interfaces. Our CAN drivers based on the „Low Level Socket Library" (ELLSI) under Ethernet UDP ensures seamless integration of other OS like QNX®, VxWorks® and more.

Side view



EtherCAN/2 web interface

Product Highlights

- CAN gateway and bridge function
- Programming via the common esd NTCAN-API
- Usage of esd's protocol stacks (CANopen, J1939, etc.) and tools (CAN SDK, CANreal, etc.)
- Web interface
- Optional software package to connect an S7-300/400 to CAN via UDP

Software

Please find more details about the available software with NTCAN-API for esd CAN and CAN FD Interfaces on page 23. Free drivers for Windows and Linux.

Technical Data

CAN bit rate	20 Kbit/s up to 1 Mbit/s
Electrical isolation	Yes
CAN connector	5-pin open style 3.81 (CiA DR 303-1)
Ethernet	100BASE-TX, IEEE802.3 RJ45-connector
Power supply	24 V (18 VDC ... 32 VDC) Ityp = 100 mA
Ambient temperature	0 °C ... +70 °C
Software Support	CAN layer 2 CANopen (Windows, Linux) J1939 (Windows, Linux)

Order Items

Designation	Order No.
EtherCAN/2 CAN-Ethernet-Gateway	C.2051.02
CANopen-LCD Windows/Linux CANopen for Windows an Linux	C.1101.06
J1939 stack for Windows	C.1130.10
J1939 stack for Linux	C.1130.11
CAN-Cable-S, 0.3 m CAN cable DSUB9 socket, length 0.3 m	C.1323.04

Scope of Delivery

- Free drivers for Windows and Linux

Product Page

esd.eu/p030

CAN-CBX-Bridge-FD

CAN Bridge for connecting CAN Classic and CAN FD Networks

This bridge connects and synchronizes two autonomous CAN FD or CAN networks effortlessly. These networks have the flexibility to operate at distinct bit rates. The local microcontroller efficiently buffers CAN data in a high-speed local SRAM, ensuring smooth communication.

Controlling of data with variable masking, allowing precise filtering of information to meet the specific needs. Our user-friendly solution offers preconfigured settings for baud rate and frame filters, easily selectable through a convenient rotary switch.

Side view

Product Highlights

- Linking of two CAN/CAN FD networks with data buffering
- Simple configuration via serial interface and generic protocol
- Data can be filtered by variable masking
- Preconfigured configurations of baud rate and frame filter settings easily selectable via rotary switch
- Galvanic isolation of CAN networks to reduce ground loops

Technical Data

CAN FD interfaces	CAN classic: Up to 1 Mbit/s CAN FD: Up to 8 Mbit/s
Serial interface	RS-232 @ DSUB9, 115.2 Kbit/s
Dimensions	22.5 mm x 99 mm x 114.5 mm
Power supply	12 VDC ... 32 VDC Imax@24V = 35 mA
Ambient temperature	-20 °C ... +70 °C

Order Items

Designation	Order No.
CAN-CBX-Bridge-FD CAN Bridge for CAN and CAN-FD	C.3090.02
CAN-Cable-B, 0.3 m CAN cable DSUB9 plug, length 0.3 m	C.1323.03

Product Page

esd.eu/p031

CAN-PN/2 and CAN-PN/2-FD

Fieldbus gateway for connecting PROFINET®-IO with CAN and CAN FD

The new PROFINET® IO to CAN FD Gateway extends fieldbus communication significantly. Connect PROFINET® and CAN networks with support for CAN FD's 64-byte data field and 8 Mbit/s speed. It's fully compatible with CAN Classic (2.0A/B) at 1 Mbit/s. For tailored solutions, there can be chosen between the CAN FD and CAN Classic variants. With easy configuration it is supporting up to 512 static CAN frames and unlimited dynamic setups. Experience reliable data transmission, even under heavy bus loads. Simplify diagnostics with USB interface and our free CANreal Windows® GUI tool.

CAN-PN/2 and CAN-PN/2-FD

Side view

CAN cable optionally available

Product Highlights

- High-Speed CAN FD: Lightning-fast communication with up to 8 Mbit/s and 64-byte data field.
- Easy configuration: Configure up to 512 static CAN frames and unlimited dynamic setups.
- PROFINET IO device with a maximum of 1440 bytes input data and 1440 bytes output data on the PROFINET bus
- Ensures data integrity even under heavy bus loads
- USB interface for easy monitoring and troubleshooting with CANreal GUI tool

Software

CAN bus monitoring with free Windows GUI tool CANreal.

Technical Data

CAN / CAN FD bit rate	10 Kbit/s up to 8 Mbit/s
Electrical isolation	Yes
Dimensions	22.5 mm x 99 mm x 114.5 mm
Power supply	24 V (18 VDC ... 32 VDC) Ityp = 120 mA
Ambient temperature	0 °C ... +50 °C
CAN controller	M_CAN (CAN) esdACC (CAN FD)

Order Items

Designation	Order No.
CAN-PN/2-FD CAN FD to PROFINET Gateway	C.2924.62
CAN-PN/2 CAN to PROFINET Gateway	C.2924.02
CAN-Cable-S, 0.3 m CAN cable DSUB9 socket, length 0.3 m	C.1323.04

Scope of Delivery

- GSDML file, example project files

Product Page

esd.eu/p032

CANopen-PN/2

Fieldbus gateway for connecting PROFINET®-IO with CANopen®

This PROFINET® IO module enables the seamless connection between CANopen modules with CANopen (CiA 301) applications, e.g. to a SIMATIC-S7 PLC. The gateway operates as a PROFINET IO device and at the other side operates as a CANopen Manager with features like Network Management, Node Guarding, and Heartbeat. It offers space for up to 126 CANopen nodes. Effortless configuration awaits through PROFINET IO configuration tool GSDML Composer. Via USB the gateway offers live view on a Windows PC using our CANreal tool.

CANopen-PN/2

Side view

Bottom view

Product Highlights

- Supports up to 126 CANopen Nodes with up to 14 RPDOs and TPDOs
- PROFINET IO device with a maximum of 1440 bytes input data and 1440 bytes output data on the PROFINET bus
- Creating configurations automatically from EDS files
- Included configuration tool GSDMLComposer for easy a start-up
- Extended error diagnostics of the CANopen nodes directly in the PLC

Software

GDSML Composer for easy generation of configuration files. Free Windows GUI tool CANreal.

Technical Data

CAN bit rate	up to 1 Mbit/s
Electrical isolation	Yes
Dimensions	22.5 mm x 99 mm x 114.5 mm
Power supply	24 V (18 VDC ... 32 VDC) Ityp = 120 mA
Ambient temperature	0 °C ... +50 °C
CAN controller	M_CAN

Order Items

Designation	Order No.
CANopen-PN/2 PROFINET IO-CANopen gateway	C.2931.02
CAN-Cable-S, 0.3 m CAN cable, length 0.3 m	C.1323.04

Scope of Delivery

- GDSML-Composer, example project files

Product Page

esd.eu/p033

CAN-DP/2

Gateway CAN to PROFIBUS-DP®-Slave

Fast and reliable linking of a PROFIBUS-DP master to a CAN network to connect e.g. a SIEMENS SIMATIC S7-300 or S7-400 to CAN.
The CAN-DP/2 gateway operates as a DP-Slave with a total max. of 300 bytes process data (in and out) for the CAN-PLC link. It supports 11- and 29-bit CAN-IDs. There is no limitation on the number of CAN nodes by the gateway. The CAN-DP/2 can be configured with standard PROFIBUS configuration tools, e.g. the PLC SIMATIC Manager.

Side view

Bottom view

Product Highlights

- CAN-PLC link, e.g. to SIEMENS SIMATIC S7-300 or S7-400
- DP-slave with max. 300 bytes process data (input and output)
- No limitation on the number of CAN nodes by the module
- 11- and 29-bit CAN-ID support
- Configuration with standard tools

Software

Configuration via the existing PROFIBUS configuration tool, e.g. the PLC SIMATIC Manager.

Technical Data

CAN interface	10 Kbit/s up to 1 Mbit/s, ISO 11898-2
PROFIBUS-DP	VPC3 controller, RS-485 interface, max. 12 Mbit/s,
Electrical isolation	Yes
Dimensions	22.5 mm x 99 mm x 114.5 mm
Power supply	24 V ± 20% Ityp = 55 mA
Ambient temperature	0 °C ... +55 °C

Order Items

Designation	Order No.
CAN-DP/2 CAN layer 2 gateway	C.2907.02
CAN-Cable-S, 0.3 m CAN cable DSUB9 socket, length 0.3 m	C.1323.04

Scope of Delivery

- CD with documentation and GSD file

Product Page

esd.eu/p034

CANopen-DP/2

Gateway CANopen® to PROFIBUS-DP®-Slave

Fast and reliable linking of a PROFIBUS-DP master to a CANopen network to connect e.g. a SIEMENS SIMATIC S7-300 or S7-400 to CANopen.
The CANopen-DP/2 gateway operates as a PROFIBUS-DP slave-I/O component. On the other hand it operates as a CANopen Manager with NMT Master and configuration capabilities. Enjoy seamless PDO and SDO data transfers. Control START frame, SYNC, and Heartbeat with ease.
The CANopen-DP/2 can be configured with standard PROFIBUS configuration tools, e.g. the PLC SIMATIC Manager.

Side view Bottom view

Product Highlights

- CAN-PLC link, e.g. to SIEMENS SIMATIC S7-300 or S7-400
- PROFIBUS-DP slave acc. to IEC 61158 (240 bytes input and 240 bytes output)
- CANopen Manager
- 11- and 29-bit CAN-ID support
- Configuration with standard tools

Software

Configuration via the existing PROFIBUS configuration tool, e.g. the PLC SIMATIC Manager.

Technical Data

CAN interface	10 Kbit/s up to 1 Mbit/s, ISO 11898-2
PROFIBUS-DP	VPC3 controller, RS-485 interface, max. 12 Mbit/s,
Electrical isolation	Yes
Dimensions	22.5 mm x 99 mm x 114.5 mm
Power supply	24 V ± 20% Ityp = 55 mA
Ambient temperature	0 °C ... +55 °C

Order Items

Designation	Order No.
CANopen-DP/2 CANopen gateway	C.2909.02
CAN-Cable-S, 0.3 m CAN cable DSUB9 socket, length 0.3 m	C.1323.04

Scope of Delivery

- CD with documentation and GSD file

Product Page

esd.eu/p035

CAN-EtherCAT

EtherCAT®-CAN Gateway

Discover our versatile CAN-EtherCAT gateway, designed to easily integrate CAN modules to a real-time EtherCAT network. It supports CANopen® (CiA DS 301) and layer-2 implementations. Use EtherCAT slave functionality in accordance with ETG Modular Device Profile No. 5000. It comes with a maximum data-transfer rate of 1 Mbit/s on the CAN high-speed interface and 100 Mbit/s on the 100BASE-TX EtherCAT interface. Protection against interference is guaranteed because both the EtherCAT and the CAN interface are galvanically isolated.

Side view Bottom view

Product Highlights

- Seamless connection between EtherCAT and CAN
- 100BASE-TX EtherCAT (IEEE 802.3) to high-speed CAN interface (1 Mbit/s)
- EtherCAT slave functionality according to ETG Modular Device Profile No. 5000
- Ethernet-over-EtherCAT (EoE) support to connect Ethernet devices to EtherCAT
- Quickstart tutorial video on product page esd.eu/p036

Software

Configuration via EtherCAT master and standard EtherCAT configuration tools.

Technical Data

CAN bit rate	50 Kbit/s up to 1 Mbit/s
Electrical isolation	Yes
Dimensions	22.5 mm x 99 mm x 114.5 mm
Power supply	24 V (18 VDC ... 32 VDC) Ityp = 150 mA
Ambient temperature	0 °C ... +50 °C
Connectors	CAN, Power: open style 3.81, EtherCAT, Ethernet: RJ45

Order Items

Designation	Order No.
CAN-EtherCAT EtherCAT/CAN gateway	C.2922.02
CAN-Cable-S, 0.3 m CAN cable DSUB9 socket, length 0.3 m	C.1323.04

Scope of Delivery

- CD with documentation and ESI file

Product Page

esd.eu/p036

ECX-EC

EtherCAT® Bridge

This EtherCAT slave bridge effortlessly connects two EtherCAT slave segments. It facilitates smooth EtherCAT process data exchange between the interconnected networks, ensuring efficient synchronization of Distributed Clocks (DC). With the ECX-EC, there is the flexibility to adjust the time of one master to the other using the precise difference between their slave time stamps, presented as a CoE object. In cases where redundancy is essential, the ECX-EC bridge serves as the first and last slave simultaneously, allowing the master to keep all slaves perfectly synchronized in both segments.

Side view

Bottom view

Product Highlights

- „Bridging“ two EtherCAT slave segments
- Up to 1024 bytes in each direction
- Time synchronization (DC) between the EtherCAT Masters
- Supports DC with redundancy
- EoE support (switch port)

Software

Configuration via popular network configuration tools (e.g. esd Workbench, TwinCAT).

Technical Data

Ethernet physics	According to IEEE 802.3 100BASE-TX
Configuration	Via CoE
Dimensions	22.5 mm x 99 mm x 114.5 mm
Power supply	24 V (18 VDC ... 32 VDC) Ityp = 100 mA
Ambient temperature	0 °C ... +55 °C
Connectors	EtherCAT, Ethernet: RJ45, Power: 4-pin open style, InRailBus

Order Items

Designation	Order No.
ECX-EC EtherCAT Bridge	E.3022.02

Product Page

esd.eu/p037

Networking

Networking Products

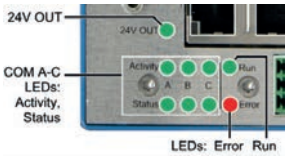
esd is a supplier of networking products for Ethernet-based fieldbus systems. This includes network switches and industrial Gigabit Ethernet switches with integrated COM server. All modules are suitable for DIN rail mounting.

Switch16/Com3

Netintegrator with COM-Server and Ethernet Switch

Switch16/Com3

The Switch16/Com3 is a versatile Ethernet switch with an integrated COM server providing 16 Ethernet ports and 3 serial COM ports which can be set up as virtual ports on the PC. One COM port is additionally equipped with a switchable 24V power supply for external devices. VLAN support enhances the network security and flexibility. The Switch16/Com3 also offers web-based network management for comprehensive statistics and monitoring. Configuring the serial interfaces on the existing host PC is a breeze, thanks to the user-friendly Windows®-based tool provided.



Status LEDs on front panel

Rear view

Product Highlights

- Gigabit Ethernet switch with integrated COM Server
- 16 Ethernet ports via RJ45 sockets
- Manageable switch architecture
- VLAN support
- 3 COM ports to be setup as RS-232, RS-422 or RS-485 interface

Software

Driver Software for Windows 7 and Windows 10 (64 bit), Windows-based configuration tool.

Technical Data

16 Ethernet ports	10BASE-T/100BASE-TX/ 1000BASE-T, IEEE 802.3
3 COM ports	DSUB9, configurable as RS-232/RS-422/RS-485
COM port power supply	COM Port A can be used as 24V/1A power supply
Dimensions	55 mm x 143 mm x 113.5 mm
Power supply	24 V -15%/+20% Imax = 500 mA
Ambient temperature	0 °C ... +50 °C

Order Items

Designation	Order No.
Switch16/Com3 16 port Ethernet Switch, 3 COM ports	A.1109.01

Scope of Delivery

- Driver Software and configuration tool

Product Page

esd.eu/p038

ECX-ETH-Selector

Switching Redundant Ethernet Networks

This selector switches physically between two Ethernet lines without manually reconnecting cables. This switch is the perfect solution for automated switching of Ethernet-based network connections like e.g. test benches. A simple, galvanically isolated control signal is used to select between two ports.

The ECX-ETH-Selector is designed for DIN rail mounting and has an additional power connector with clamp connection.

Side view

Bottom view

Product Highlights

- Seamlessly switch between two masters or networks with a simple control signal.
- Galvanic isolation ensures signal integrity and dependable operation
- Compatible with Ethernet-based systems and various fieldbus standards up to 1000BASE-T
- Designed for DIN-EN rail mounting, making setup quick and hassle-free
- Backed by the expertise of esd electronics, delivering top-notch products for the specific network needs

Technical Data

Bit rates	1000BASE-T 10/100/1000 Mbit/s
Electrical isolation	Yes
Dimensions	22.5 mm x 99 mm x 114.5 mm
Power supply	24 V ± 20% Ityp = 20 mA
Ambient temperature	0 °C ... +70 °C
Control voltage (off / on)	Off: -5 ... +8 VDC On: +11 ... +32 VDC

Order Items

Designation	Order No.
ECX-ETH-Selector EtherCAT / Ethernet Master Selector	E.3025.01

Scope of Delivery

- Connector for power supply

Product Page

esd.eu/p039

ECX-Master-Selector

Dual Ethernet Master Selector for two redundant EtherCAT®, Sercos III, PROFINET®, ... -Masters

In systems with redundant controllers, the ECX-Master-Selector switches physically between industrial Ethernet-based systems such as EtherCAT®, Sercos III, PROFINET® with a simple, galvanically isolated control signal.

The ECX-Master-Selector is designed for DIN rail mounting and has an additional power connector with clamp connection.

Side view

Bottom view

Product Highlights

- Build redundant Ethernet based master systems like EtherCAT, Sercos III, PROFINET
- Switch network with cable redundancy via a control signal to primary or secondary master
- Establish redundancy on the master side as an extension to the ETG or Sercos III standard
- Compatible for all Ethernet based systems or field bus standards
- 24V switching voltage

Technical Data

Ethernet physics	100BASE-TX, IEEE 802.3
Electrical isolation	Yes
Switch signal	Uin = 11...32 VDC / Imax= 6 mA according to EN 61131-2, type 3
Dimensions	35 mm x 99 mm x 114.5 mm
Power supply	24 V ± 20% Ityp = 14 mA
Ambient temperature	0 °C ... +70 °C

Order Items

Designation	Order No.
ECX-Master-Selector	E.3021.01

Scope of Delivery

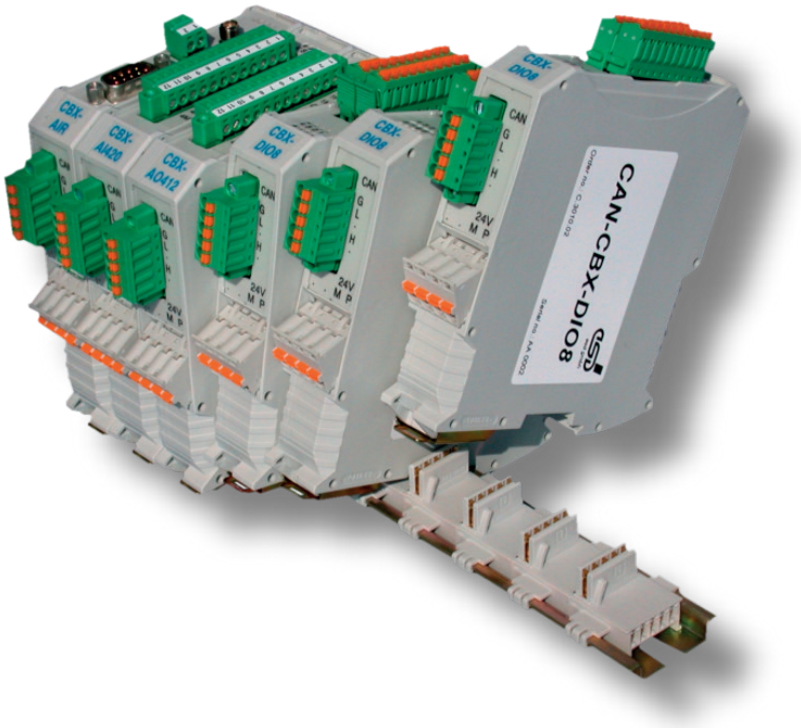
- Connector for power supply

Product Page

esd.eu/p040

I/O Modules

I/O Modules



esd electronics offers a wide range of compact stand-alone I/O modules for CANopen and EtherCAT. The modules of the CAN-CBX series offer the possibility of easy mounting in the DIN rail due to the InRailBus.

CAN Modules with InRailBus

Standard I/O and customized applications

Our CAN-CBX-Modules can be used as stand-alone CANopen moduels or linked via the InRailBus. A replacement of individual modules from the InRailBus is possible without interruption of CAN or supply voltage. The modules have galvanically isolated CAN/CANopen interfaces according to ISO 11898-2 with bit rates up to 1 Mbit/s. Our product portfolio also includes other I/O Modules, which can be found on our website.

esd.eu/p064

CAN-CBX-DIO8/2 - CAN/CANopen® Module with 8 I/O Channels

- 8 independently programmable digital input/output ports for flexible integration
- Inputs can be configured with various functions, including edge-triggered events and counters
- Advanced 32-Bit Counter Inputs with Trigger and CAN Messaging

CAN-CBX-DIO8/2
Order No.: C.3010.04

esd.eu/p041

CAN-CBX-REL4/2 - CAN/CANopen® Module with 4 Relay Contacts

- Relay Solution with 2 Change-over Contacts and 2 Make Contacts
- Reliably switch up to 8 A up to 100,000 times
- Simultaneous switching of up to 32 relays with one PDO / CAN frame
- Automatic switchover to the specified state in the event of system errors

CAN-CBX-REL4/2
Order No.: C.3012.04

esd.eu/p042

CAN-CBX-AI814/2 - CAN/CANopen® Module with 8 14-bit Inputs

- Precise measurements with 8 electrically isolated analog-to-digital converter channels with 14-bit resolution
- Fast data sampling with up to 100 µs sampling rate in parallel across all 8 channels
- Cyclic, Trigger, Limit indicated Messages for system monitoring

CAN-CBX-AI814/2
Order No.: C.3020.04

esd.eu/p043

CAN-CBX-PT100/2 - CAN/CANopen® Module with 4 RTD Inputs

- Wide temperature application range with flexibility in choice of Pt or Ni probes.
- High-precision measurements with adjustable resolution and 4-wire connection technology
- High-accuracy resistance measurements with adjustable sensing current
- Sampling rate adjustable as required in the range from 2.5 to 1000 SPS

CAN-CBX-PT100/2
Order No.: C.3032.04

esd.eu/p044

VMEbus

VMEbus

The VMEbus is primarily used in applications with increased safety and reliability requirements. The portfolio of esd includes many standard components like VME boards with reliable Power PC architecture, but also customer specific developments.

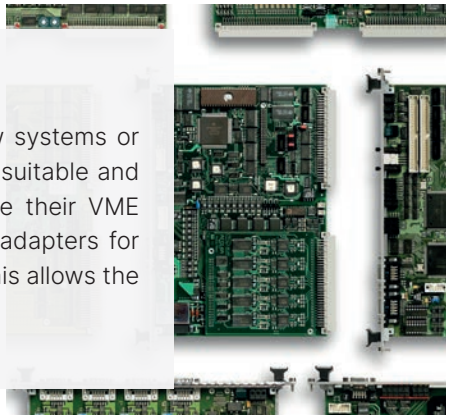
VMEbus Technology at esd - still up to date

CPU and I/O boards for industrial and research applications

The VMEbus is primarily used in applications with increased safety and reliability requirements, such as the Transrapid, the ISS, the European navigation system Galileo and at CERN, the European Organization for Nuclear Research. It can also be seen in systems in the maritime environment, in medical technology and in military applications. And many industrial applications use VMEbus since several decades.

VMEbus boards for long term operation

Due to the long lifetime of these systems, many components, either for new systems or as spare parts, are difficult to procure. esd faces this problem by developing suitable and compatible replacement components. While other manufacturers discontinue their VME products, esd has launched new future-proof CPU and I/O boards. Suitable adapters for the reliable connection of process I/O and interfaces complete the portfolio. This allows the systems to operate over a long period of time in the future.



Customized developments, systems and adapters

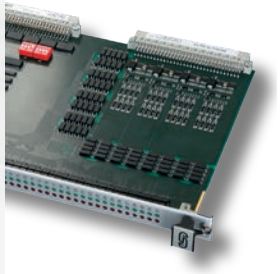
esd also develops and manufactures VMEbus boards according to customer specifications for individual applications. The customers benefit from many years of experience with VMEbus systems. If the new product has to replace a thirdparty product, one of the most important requirements is full compatibility with the discontinued product. If that is achieved the systems can be operated without any change.

esd.eu/p045

Product Portfolio

Powerful CPU boards like VME-CPU/T10 with reliable PowerPC architecture and the VME-DIO32 as an easy-to-use IO board are newly developed products. Several Mezzanine cards to extend the VMEbus via carriers are available. Particularly worth mentioning are the XMC-CPU/Zulu with Zynq processor and FPGA-SoC or the PMC-CAN/402 as a high-performance CAN interface. With these components existing VMEbus systems can be kept at the „state of the art“. esd also provides Board Support Packages and drivers for Real Time OS like VxWorks and QNX.

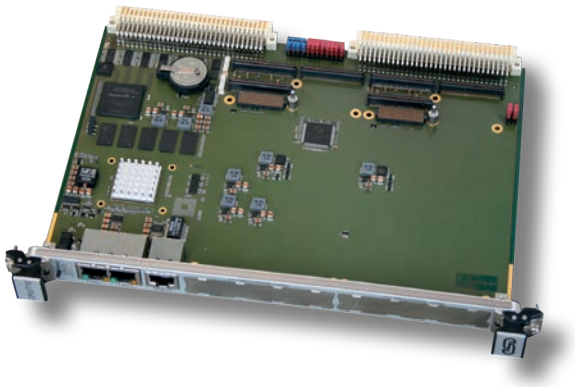
esd.eu/p046



VME-CPU/T10

VME Master CPU with 64-bit PowerPC® T1022 and XMC/PMC Slots

This VMEbus CPU card is powered by the NXP PowerPC® QorIQ T1022 and offers two XMC/PMC slots. It features 64-bit e5500 Power-Architecture® cores with DPAA. The VMEbus master interface offers A16/A24, D16/D8 (EO), and SGL arbiter.
XMC1 has a 1-lane PCIe, while XMC2 has 4 lanes. Two PMC interfaces support 32-bit/66 MHz PCI bus. Two Gigabit Ethernet interfaces are located on the front panel, with one optionally routed to VME P2 at up to 100 Mbit/s. Our BSPs support OS-9, QNX®, VxWorks®, and Linux®. An EtherCAT master stack is available for each supported OS.



Product Highlights

- High-End 64 bit PowerPC® QorIQ T1022 CPU
- 2x XMC/PMC slots, 2x Gigabit Ethernet
- I/O interfaces designed to be compatible with Motorola CPU MVME5110
- Wide range of software support
- Customization on request

Software

BSPs from esd are available for OS-9, QNX®, VxWorks® and Linux®. EtherCAT® master available.

Technical Data

CPU	NXP PowerPC QorIQ T1022, 64-bit, Dual Core e5500, 1.2 GHz, FPU
VMEbus interface	Master A16/A24 D16/D8 (EO), SGL Arbiter, IEEE 1014 Rev. D
PMC/XMC	2x XMC according to VITA 42.3, 2x PMC acc. to IEEE Std 1386-2001
Interfaces	2x Gigabit Ethernet, USB 2.0, Console @RJ45 (compatible to MVME5110)
Ambient temperature	0 °C ... +55 °C

Order Items

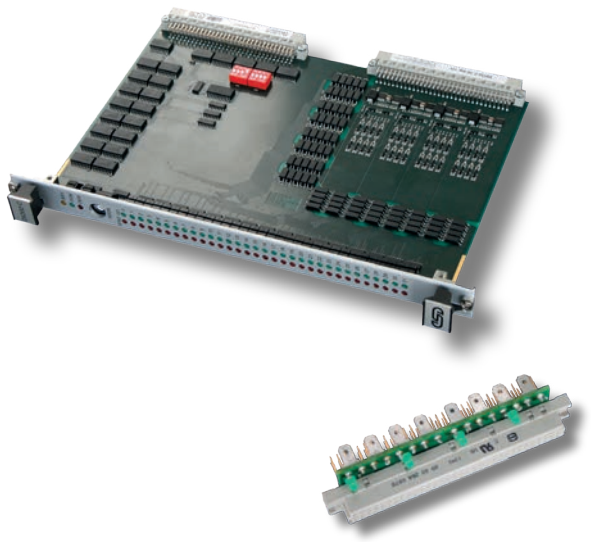
Designation	Order No.
VME-CPU/T10 VME QorIQ T1022 PowerPC CPU Board, 1.2 GHz	V.1940.01
VME-CPU/T10-Linux-BSP incl. 12 months support	V.1940.57
VME-CPU/T10-QNX-BSP incl. 12 months support	V.1940.55
VME-CPU/T10-OS9-BSP incl. 12 months support	V.1940.56
VME-CPU/T10-VxW-BSP incl. 12 months support	V.1940.58

Product Page
esd.eu/p047

VME-DIO32

VMEbus Board with 32 digital Inputs and 32 Outputs for industrial use with long remaining Lifetime

This VMEbus Board provides 32 opto-isolated digital IO channels. The IO channels can be set and read out via a digital process interface. The IOs and the power supply are connected via the P2 connector of the board. The 32 digital IO channels are arranged in 4 groups of 8 IO channels each, whereby each group must be supplied with power independently. These 4 groups are galvanically isolated from the VME system and from each other. The VMEbus interface of the VME-DIO32-C uses addressing as A16 slave an D08(O), the VME-DIO32-L uses addressing as A24 slave and D16/D08(EO).



VME-DPIO32-P2VCC

Product Highlights

- Digital process IOs with wide voltage range
- 32 digital IO channels are arranged in 4 groups of 8 IO channels each
- Optical isolation and surge protection
- VME-DIO32-C can be used as successor for JanzTec VDOT-32
- VME-DIO32-L can be used as successor for esd VME-DPIO32/63140 (V.1607.04)

Software

C-Drivers for VxWorks and OS9 are available for the VME-DIO32-L.

Technical Data

Number of I/Os	32 IOs, electrically isolated, arranged in 4 groups with 8 channels
Digital input data	Uin = -3 V ... 32 V, Uon ≥ 12 V, Uoff ≤ 5 V
Digital output data	High side driver, output current: Ityp: 0.50 A, Imax: 0.75 A
VMEbus interface	VME-DIO32-C: A16, D08(O) VME-DIO32-L: A24, D16/D08(EO)
Ambient temperature	0 °C ... +70 °C

Order Items

Designation	Order No.
VME-DIO32-C 32 digital IOs, A16 Slave, D8O	V.1607.06
VME-DIO32-L 32 digital IOs, A24 Slave, D16 / D8E (O)	V.1607.05
VME-DPIO32-P2VCC 24 V connection for P2	V.1607.90
VME-DPIO32-VxW C driver for VxWorks for VME-DPIO32-L	P.1607.56
VME-DPIO32-OS9 C driver source code for OS-9, VME-DPIO32-L	P.1607.50

Product Page

esd.eu/p048

Contacting esd

Technical Support

You need support for an esd product?

Our team will be glad to offer you assistance like

- answers on technical questions
- further technical documentation
- latest software updates
- help on login and accounts

Contact:
+49 (0)511 37298-130
support@esd.eu

esd.eu/p049

Sales

You would like to know more about buying a selected product?

Our sales colleagues will provide

- detailed product information
- quotations for products and engineering
- prices and delivery times

Contact:
+49 (0)511 37298-0
sales@esd.eu

esd.eu/p050

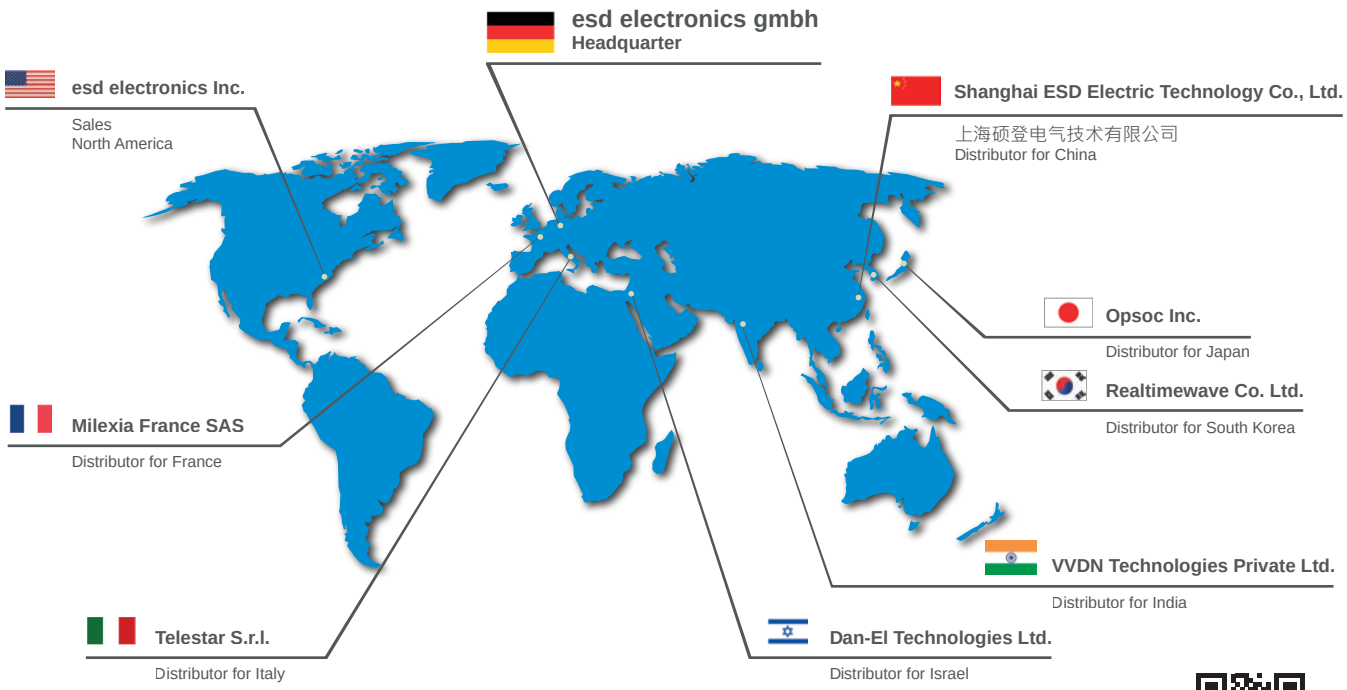
Support Center

The first point of contact for all questions and information about our products. We offer you a self-service support portal with helpful information and numerous downloads including an overview of our current data sheets, a listing of all available manuals and download options for our software.

esd.eu/p051

Worldwide esd representations

We have sales offices and distributors in several countries. You can contact your local distributor directly.



You can find all worldwide contacts here >

esd.eu/p052

Standardisation and Memberships

The CAN in Automation Nutzerorganisation e.V. (CiA®) is a nonprofit association which fosters the image of the CAN Technology. Together with the members, they develop the specifications for different CAN application fields. esd electronics is a founding member of the CiA® and is also part of their Business Committee and their Technical Committee for many years.

The PCI Industrial Computer Manufacturers Group (PICMG®) is a nonprofit consortium of companies and organizations founded in 1994. They develop open standards for military, industrial and general purpose embedded computing applications, like CompactPCI® and CompactPCI Serial®. esd is a member of the PCI Industrial Computer Manufacturers Group (PICMG®) since many years.

The EtherCAT Technology Group (ETG) is a global organization in which the further technology development of EtherCAT is supported and promoted by different parties like end users and technology providers. The ETG is the world's largest Industrial Ethernet organization. esd electronics is an active member of the EtherCAT Technology Group (ETG) for many years.

The VMEbus International Trading Association VITA™ is a non-profit organisation of suppliers and users with a market interest in modular, embedded real-time systems. VITA became known through the publication of the VMEbus specification in 1994. esd is a member of the VMEbus International Trading Association VITA™.

The PROFIBUS user organisation e.V. (PNO) is the world's leading industry association for the standardisation and dissemination of industrial communication and information technologies. The core technologies are PROFIBUS, PROFINET, IO-Link and omlox. esd electronics is an active member of the PROFIBUS user organisation e.V. (PNO) for many years.

ODVA is a global association with world's leading automation companies as members. Core technologies of the association are among others EtherNet/IP and DeviceNet, which are also used in esd products. esd electronics has been a member of ODVA since 1998.

Peripheral Component Interconnect Special Interest Group (PCI-SIG™) is an electronics industry consortium responsible for specifying Peripheral Component Interconnect, PCI-X and PCI Express computer buses. esd electronics is a member of the Peripheral Component Interconnect Special Interest Group (PCI-SIG™).

The OPC Foundation develops and maintains the standard of the OPC (Open Platform Communications). The OPC is the interoperability standard especially in the industrial automation space for secure and reliable exchange of data. This standard was developed by industry vendors, software developers and end-users. esd is a logo member of the OPC Foundation.

ISO 9001:2015 Certification

esd electronics is certified according to the international standards ISO 9001:2015. It is the world's best-known and most successful management system for quality management. esd thus proves the quality and effort that goes into every esd product.

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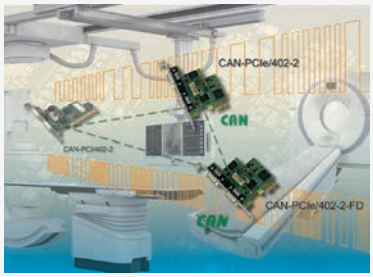
www.esd.eu

Technology: Why is CAN FD so much better than CAN classic?



The CAN fieldbus with millions of installed devices has dominated the lowlevel fieldbus market since many years.
Now, CAN has been further developed into CAN FD with new features while maintaining the benefits of CAN. „Thanks to the backwards-compatible design, CAN applications can be simply upgrade to the more powerful CAN FD communication“, so Dirk Flege, Sales Manager at esd electronics.

Read more
esd.eu/p053

Case Study: Best in-class Robots rely on EtherCAT and QNX

The result after 10 years of development is really impressive. „Our robot is the best-in-class robot for minimally invasive surgery”, says the Spanish company Rob Surgical proudly. „Innovation saves lives” - this is the mission of the company. To achieve this goal esd electronics provided EtherCAT software and support for the Real Time OS QNX.

Read more
esd.eu/p054

Case Study: Taking the Horror out of Obsolescence

Due to its robustness and real-time capability the standardized VME-bus technology is still used in projects with higher demands. But what to do, when the Control System is Safety Certified and components become obsolete? Developing fully compatible replacement components can ensure future availability at moderate costs.

Read more
esd.eu/p055

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